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Savannah State College

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3. While it is recommended that the *Chicago Manual of Style* be followed, contributors are given freedom to employ other accepted documentation rules.
4. Although the *Bulletin* is primarily a medium for the faculty of Savannah State College, scholarly papers from other faculties are invited.

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of
The Savannah State College Bulletin
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Volume 19, No. 2 Savannah, Georgia December, 1965

HOWARD JORDAN, JR., *President*

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Preface

Through the publication of the *Faculty Research Bulletin* the Committee on Faculty Research affords the faculty and staff an opportunity to share with their colleagues their academic endeavors and accomplishments.

The use of research methods to solve institutional, as well as individual problems, is a desirable characteristic of college faculties. Therefore, the publication of this bulletin has served as a stimulus for encouraging new contributions and interests. It is hoped that this bulletin will encourage and stimulate the present contributors and other members of the staff to initiate and/or continue studies which provide for better educational opportunities here at the College and in the fields of higher education. Moreover, an active growing faculty helps students to develop habits that lead to continuous growth.

The ultimate goal of the Administration, Faculty and Staff of Savannah State College is to upgrade the intellectual tone, as well as strengthen ourselves and our students academically, thereby molding a firm foundation from which to continue to build an Institution second to none. This issue of the *Bulletin* lends itself to this objective.

HOWARD JORDAN, JR.

President

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On The Dependence of O-H Bond Length on The O-O Bond Length in Hydrogen Bonded O-H...O Systems

by

V. Ananthanarayanan

Introduction

In recent times several experimental and theoretical studies on the hydrogen bonded O-H...O vibrations have been made. During the studies on such vibrations in carboxylic acids made by the author [1, 2], certain interesting evidences relating to the O-H bond length (r) in monomeric and dimeric carboxylic acids were observed. The location of hydrogen atom positions by conventional x-ray diffraction methods is usually accompanied by uncertainties and thus the estimation of the O-H bond lengths by other methods capable of giving more certain bond lengths is of great interest.

Vibrational Spectra Data

The lowering of the O-H stretching frequency (ν_{OH}) from its free or unbonded value of $\sim 3600\text{cm}^{-1}$ in the vapor state to lower values due to the hydrogen bond formation is well known. Thus when the O-H...O bond length (R) is about $2.6 \text{ \AA}$, the ν_{OH} frequency is $\sim 2000\text{cm}^{-1}$. The correlation of the ν_{OH} and R have been extensively used to judge the strength of the hydrogen bond.

Studies made on the vibrational spectra of carboxylic acids show that one observes characteristic frequency due to O-H bond at 2.84μ (3521 cm^{-1}) in monomers and at 3.25μ (3073 cm^{-1}) in dimers, lowered due to the formation to the hydrogen bonds between the acid dimers.

THE RELATION BETWEEN THE VALUES r , R and ν_{OH} IN HYDROGEN BONDED SYSTEMS

Empirical correlations of the interdependence of r , R and ν_{OH} values are available in the literature [3]. While many potential models which treats the vibrational spectrum of the hydrogen bridges are available, the one developed by Lippincott and Schroeder [4] is most successful in explaining the various aspects of O-H...O Systems. The author applied this model to explain the low frequency hydrogen bridge vibrations in carboxylic acids [1] with considerable success.

This force field visualizes the hydrogen bond to be made up of two bonds O (I) H . . (II) O where bond I is equivalent to a slightly stretched typical covalent bond and the bond II is a weak bond which is equivalent to a highly stretched bond. The hydrogen atom is located along the line of centers between the two oxygen atoms making up the bond and a repulsive Van der Waal's potential and an attractive electrostatic potential is assumed to exist between the two electronegative atoms of the hydrogen bond. Through the application of conditions describing a stable equilibrium the following expression has been derived by Lippincott and Schroeder:

$$r-r_0 = \left[\left\{ \exp(-n^* [R-r-r_0^*]) \right\}^2 / 2(R-r) \right] \\ \div \left\{ \exp \frac{n(r-r_0)^2}{2r} \right\} \left[\frac{r^2 (R-r-r_0^*) (R-r+r_0^*)}{(R-r)^2 (r+r_0)} \right] \quad \text{---(1)}$$

where

R = equilibrium O---O distance

r_0 = equilibrium length of
bond I = 0.96×10^{-8} cm
= r_0^* = equilibrium
length of bond II

n = a constant of
potential function
for bond I = $9.18 \times 10^8 \text{ cm}^{-1}$

b = repulsion constant of the
potential function =
 $4.8 \times 10^8 \text{ cm}^{-1}$

r = length of bond I

r^* = length of bond II = $(R-r)$

n^* = gn , where $g = 1.45$,
and n^* being the constant
of potential function for
bond II.

This equation is suitable for calculating Δr i.e. $(r-r_0)$ as a function of R by the method of successive approximations. Similar expressions for the relationship between $\angle \text{OH}$ and R have been reported and extensively used. For greater details the original papers should be referred to.

There are several ways in which the observed $\angle \text{OH}$ frequencies could be used to calculate the OH bond lengths in monomers and dimers. First a diatomic model with the reduced mass of the O-H

bond could be used to calculate the stretching force constants (K_{OH}) of the OH bonds in dimers and monomers. The simple relation for this is as follows:

---(2)

$$K_{OH} = 4\pi^2 C^2 \mu \omega_{OH}^2$$

where C = velocity of light

μ = reduced mass of the system

These values of K_{OH} could be substituted in the Badger's relation [5],

$$r_{OH} = \left(\frac{C_{ij}}{K_{OH}} \right)^{\frac{1}{3}} + d_{ij}$$

where C_{ij} and d_{ij} are constants, tabulated by Badger, which depend on the atoms forming the bond. The force constants were calculated to be 6.85×10^5 dynes per cm in the monomers and 5.21×10^5 dynes per cm in the dimers. Substitution of these values in the Badger's relation leads to the O-H bond length values of 0.98 Å in monomer and 1.04 Å in the dimers.

There is one very interesting evidence for such bond length changes available in literature. In the case of the diatomic O-H the vibrational and rotational constants for the electronic states are well known. Fortunately for two electronic states the values of the stretching frequencies and the internuclear distances are known very precisely [6]. They are as follows: 3735 cm^{-1} and 0.9706 Å in the $2\pi^i$ state; 3181 cm^{-1} and 1.0121 Å in $2\Sigma^+$ state. The "frequency difference" $\Delta\nu_{OH} = 554 \text{ cm}^{-1}$ is fairly close to the case under consideration in our discussion. The value Δr for this change of frequency corresponds to 0.042 Å . Substitution of these frequencies in relation (1) gives the results that Δr could be as much as 0.044 Å for this order of change in OH frequencies. This is easily verified since Δr values for relation (1) as function of R and ω_{OH} are tabulated at convenient intervals by Lippincott and Schroeder.

Due to favorable scattering factors of hydrogen atoms, neutron diffraction studies are of great help in locating hydrogen atom positions in molecules and crystals. Such studies on many O-H---O bonded crystals have been reviewed by Hamilton [7]. It had been proposed that the following type of relation connecting O-H and O---O bond lengths is generally valid:

$$r(\text{O-H}) = 1.574 - 0.2145R(\text{O---O}) \quad \text{---(3)}$$

Although precise, comparably accurate, individual O-H bond lengths for monomers and dimers are not available, it is well known that the O-H---O bonds in many carboxylic acid dimers are reported to be 2.65 Å long. The data used to formulate relation (3) has been also plotted in the form of smooth curve relating R and r by Pimentel among others [3].

Such curves predict that in a non bonded case O-H bond length is as low as 0.96Å. From these data also it seems the actual O-H bond length changes involved may be as much as 0.05Å.

Conclusion

There seems to be considerable evidence derived from diverse types of experiments supporting the view that the O-H bond lengths in carboxylic acid dimers and monomers differ as much as 0.04Å.

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An Approach to the Fiction of Miguel De Unamuno

by

Alma C. Allen

I

The unifying element in the fiction of Miguel de Unamuno is the realistic attitude toward man's existence. The world is made not so much for objective commentary as for inner conflicts and emotions. Further Unamuno reduces the world of emotions to the struggle against annihilation. This broad sentiment, undergirded by a preoccupation with death, pervades all his novels. In *Niebla* the failure of reality to conquer unreality is death; in *Amor y Pedagogía* the irreconciliation between life and scientism is tragedy; *Abel Sánchez* is death by passion; *La Tiá Tula* epitomizes human and spiritual conflict; *Tres Novelas Ejemplares* illustrates the drive from self identity to death; finally, *San Manuel Bueno, Mártir* is the unsuccessful confrontation with the problem of immortality of the soul. Certainly, the predominant negativism and the preoccupation with suffering and death join each novel to its successor and all to one central idea. The form is the novel; yet it is to the philosophy rather than the artistic form that the author attaches importance.

With Unamuno a prerequisite is a study of his early impressions, for early problems begun in his youth were further accentuated in his mature years. Miguel de Unamuno was born in Bilbao, a town where, in the mid-nineteenth century, ruralism and civic and spiritual conflicts were at great heights. The leaders of Bilbao, rebelling against the concept of Spain as an idea, were liberal workers for mild social and religious reforms.

Unamuno was born in 1864 which meant, chronologically, that the first of the interminable civil wars had ended (1833-1840). The Second Carlist War which Unamuno witnessed covered the years 1870 to 1876. The brutal violence of a community divided against itself greatly disturbed the author. So great was his psychic scar that *Paz en la Guerra* (1897) is the verbal rendition of the bombardment and liberation of his birthplace.

The struggle between the Liberalists and Monarchists grew for two decades, and became an obsession with Unamuno. Eager for a new message, Unamuno was a reaction against narrow patriotism, the orthodox, and national disintegration.

The largely autobiographical *Paz en la Guerra* (1897), the long novel on the Carlist War (1874), was to share with his countrymen the native tradition. On the one hand, realism abounds in the long passages of the land and the people. On the other, the novel, while part of the author's realistic concept, is the only one which does not belong to his pessimistic, agonizing philosophy of the later years.¹

Amor y Pedagogía came a few years after the Carlist novel in 1902. Avito Carrascal, attempting to gain scientific perfection for his son Apolodoro, encourages absurdities from Fulgencio Entrabosmares, the scientist. In the end the son commits suicide, an obvious failure. *Amor y Pedagogía* is unconvincing. To the detriment of artistic details, the novelist ridicules science, though Barea contended "the distortion of science [was] the 'killing force'."²

Before the third novel appeared twelve years later, Unamuno had been appointed to and relieved of the position as Rector of Salamanca University. *Vida de D. Quijote y Sancho* (1905) and *Del Sentimiento Trágico de la Vida en los Hombres y en los Pueblos* (1913) were already gathering momentum. To some extent Unamuno had come into his own in 1898, for the 'generation' was now accepting his points of view. By this date, too, Unamuno was championing the 'inward tradition'. When *Niebla* appeared in 1914, therefore, it was projected against a political and intellectual storm. The author had succeeded as the 'despertador de las almas durmiendas'.

Niebla belongs to this struggle of the eternal conflict. By method, it refuses conventional emphasis upon character-portrayal and setting. Again, by method, it seeks its own genre—the 'nivola'.³ By content,

¹The keynote of peace within sombre despair is apparent throughout the story. The varied quotations below will illustrate sufficiently: "Pedro Antonio sentía una calma grande, como no la había sentido desde la muerte de su hijo, una calma que le llenaba el espíritu de la libertad del aire, de la serenidad del cielo . . ." [Unamuno, Miguel de, *Paz en la Guerra*, (Librería de Fernando Fe Carrera de San Jerónimo, 1897) p. 319.] "Empezó el pueblo a gustar la paz como la salud el convaleciente; volía todo a su cauce antiguo, a sus casas los emigrados e iba a recobar lozanía la vida del trabajo, y a re-enquiciarse los negocios en suspenso. . ." [*Ibid.* p. 324] The following passage shows the author's probable contradictory stand. However, war may be regarded as a means toward the end of peace. "Paz . . . paz . . . ¡ la paz puede ser una apostasía, un pacto nefando con el infierno . . . ¡ No, paz no!" guerra continua a los enemigos de Dios . . . el grito de Julio II 'fuera los bárbaros!' Todo eso de religión de paz, hay que entenderlo . . . Nuestro Señor Jesucristo no vino a meter en la tierra paz, sino espada y fuego,—lo dijo él mismo.—vino á poner disensión y guerra y a dividir á los de cada casa . . . ¡ Paz, paz!, sí, con Dios y consigo mismo, pero guerra, guerra continua contra los malos . . ." [*Ibid.* p. 328.] Compare the idea in the above quotation with this: "La guerra ha sido siempre el más completo factor de progreso . . ." [Unamuno, Miguel de, *Del Sentimiento Trágico de la Vida*, Espasa—Calpe, Argentino, 1950, p. 94.]

²Barea, Arturo, *Unamuno*, Bowes and Bowes. Cambridge, 1952. pp. 19-20.

³Unamuno, Miguel de, *Niebla*, Renacimiento, San Marcos, Madrid. Chapter 31.

Niebla develops great interplay between reality and unreality. Augusto Pérez, the hero, speaks often thus: "Y la vida es esto, la niebla. La vida es una nebulosa."⁴

From the artistic point of view the story, like some others, lacks strength. Besides, the philosophical theme had been used many times before, even by the author himself in an essay called "La Vida es Sueño" (1898).

The main thread of the story stems from Augusto Pérez, unrealistic in his unrequited love from Eugenia, a pianist, who herself is in love with the irresponsible Mauricio. As if in a dream, Augusto is pushed into a foolish offer of marriage of presumed mutual benefits. Eugenia solves the financial problem and elopes with her lover to blast the hopeful dreams of the hero.

One may comment upon *Tres Novelas Ejemplares* (1920), though the three are novelettes. Included are *Dos Madres*, *El Marqués de Lumbria* and *Nada Menos que Todo un Hombre*, the latter perhaps the best-known of the group. In both *Dos Madres* and *El Marqués de Lumbria*, the willpower resides in the heroines. The last novelette, by strong contrast, embodies strong willpower in an eccentric husband who, when he brings about the death of his unsuspecting wife, is himself strangely conquered by lack of will.

Abel Sánchez and *La Tía Tula* appeared in 1921. These two novels, in addition to *San Manuel Bueno, Mártir*, may be his best. The three are the best integrated, the most human, and the most acceptable as novels in the conventional use of the word. *Abel Sánchez*, being patterned after the Cain and Abel theme, shows the successful painter Abel Sánchez as the constant object of jealousy by Dr. Joaquín Monegro, the sensitive but intelligent 'brother'. By spurning Joaquín's earnest offer, Helen creates greater cause for envy in accepting marriage to Abel. The plot increases with torture, suffering, and frustration. When Abel's insult upon Joaquín causes the latter to shock him into death, Joaquín becomes Cain. From this point on, he never recovers.⁵

Though the question of immortality is laid bare, passionate hope outweighs any despair given, and there is enough substance to satisfy the mind, the last element in the author's search for truth.

⁴*Ibid.* p. 33.

⁵Lessons on human frailties are evident in such passages as the following: "Titularíase *Memorias de un médico viejo* y sería las mies del saber del mundo, de pasiones, de vida, de tristeza y alegrías, hasta de crímenes ocultos, que había cosechado de la práctica de su profesión de médico. Un espejo de la vida, pero de las entrañas, y de las negras, de ésta; una bajada a las simas de la vileza humana; un libro de alta literatura y de filosofía acibarada a la vez . . ." [Unamuno, Miguel de, *Abel Sánchez*, The Dryden Press, New York, 1947. p. 164.]

In his last work, *San Manuel Bueno, Mártir*, the author again makes known his search for immortality. Here, however, the search finds a solution in this life.⁶

III

It is well to re-emphasize well known tendencies in the fiction of Unamuno and in terms of new ones suggested to reach a synthesis of the perspectives.

Broadly speaking, the fiction of Unamuno discourses upon either an idea or a passion. In *Paz en la Guerra, Amor y Pedagogía, Niebla* and *San Manuel Bueno, Mártir*, if we regard the first as fiction, he has chosen the idea: war, science, reality, and immortality. In *Dos Madres, El Marqués de Lumbria, Nada Menos Que Todo Un Hombre, Abel Sánchez* and *La Tía Tula*, it is passion; the first two novelettes and *La Tía Tula* are motivated by the maternal instinct and willpower, the third novelette by willpower, and *Abel Sánchez*, by jealousy.

Unamuno's subject matter is confined, to be sure, to human suffering. However, it is equally true that he deeply dramatizes death. His insistence on both attributes makes for a general overtone of frustration, gloom, and unhappiness. Such is the exterior world about which Unamuno writes.

Generally speaking, the interior world is a duplication and is pursued according to a 'pseudo-literary' method. Indeed, the leading characters are plagued by conquering obsessions and frailties. Consequently, the dream conquers Augusto Pérez; scientism destroys Apolodoro; blinding willpower makes murderers out of Raquel and Caroline; and jealously destroys life's meaning for Joaquín. There is one exception: *San Manuel Bueno*. Yet, Unamuno's preoccupation with a sick humanity still serves as a generalization.

The unifying element in all the fiction is man's earthly existence. Various aspects of human life are explored in this perspective. His emphasis ends in man's hunger for immortality which he was to develop at length in 1913. Philosophy of human endeavor was equated with uncovering the truth and the thirst for preservation—for immortality. Prior consideration has been given the likelihood that Unamuno through his fiction will fulfill his probable expectation to arouse in more and more men the importance of man's preservation. What the author communicates is challenging to serious minds, but even to them the overwhelming indulgence in philosophy, how-

⁶Observe, then, the following lines: "Hay que vivir! Y él me enseñó a vivir, él nos enseñó a vivir, a sentir la vida, a sentir el sentido de la vida . . . El me enseñó con su vida a perderme en la vida del pueblo de mi aldea, y no sentía yo más pasar las horas, y los días y los años, que no sentía pasar el agua del lago. Me parecía como si mi vida hubiese de ser siempre igual. No me sentía envejecer. No vivía yo ya en mí, sino que vivía en mi pueblo y mi pueblo vivía en mí." [Unamuno, Miguel de, *San Manuel Bueno, Mártir*, Espasa—Calpe, Argentina, South America, 1951. pp. 56-57.]

ever praiseworthy and scholarly, his difficult language, and his constant repetition markedly decrease the possibilities of impressing numbers of people. Again the author's determined lack of consideration for literary form has created a serious impasse. Yet, one does not deny all value to the message. Unamuno reveals an astonishing awareness of human problems. A prolific writer of distinct vitality, he established connections with the intelligentsia in his unswerving concentration of mind and of purpose. These qualities largely account for an influence which has been tremendous in the past few years. It seems destined to continue.

IV

Unamuno's anti-monarchial, anti-materialistic, anti-intellectualist stand has been given, and his attack upon superstitions and unthinking has been well documented. Perhaps, less well developed is the author's treatment of evil.

The literary technique is interesting, for it is not the symbolic representation of evil as was the case, for example, with Melville's *Moby Dick* or Camus' *La Peste*. There is scholarly agreement that Camus' *La Peste*, by means of a bubonic plague of epidemic proportions, states the interaction between man and evil as one universal force. Captain Ahab's exciting, painful pursuit of the white whale, moreover, is but man's struggle against the problem of evil. Both Camus and Unamuno are moderns, but the Spaniard's internalization of emotion is uppermost. Unamuno the psychologist puts man the individual in the position of showing stage by stage what goes on in the human mind during mental stresses.

A daring challenge against feeble convictions or exaggerated passion shocks the reader into new sensibilities. The reader becomes involved in the probing of an emotional crisis. He is more apt to know what is happening than to tolerate or be in sympathy with the character. In Hugo's *Les Misérables* or Dostoevsky's *The Brothers Karamazov* the emotional experience broadens the reader's sense of humanity. Stowe's *Uncle Tom's Cabin* and Dickens' *Nicolas Nickleby* are said not only to mirror but also to influence society or history. Contrasting sharply with these authors, Unamuno shows evil in its most dominant form; it is then to become a force to action. Thus is described the anatomy of evil made simultaneous with a sense of urgency. Analysis of evil must share equal advantage with the creation of tolerance or with critical appraisal of the role of death.

The Problem of Theoretical Approach in Economic Investigation

By

Sarvan K. Bhatia

What is the nature and the source of theory? How is it related with facts? Can we consider a fact without relating it to other facts? "Facts by themselves are dumb; before they will tell us anything, we have to arrange them and the arrangement is a theory" argues Clay.¹ According to Schumpeter, "Our science cannot, any more than others, dispense with that refined common sense which we call 'theory', and which provides us with the tools for approaching both facts and practical problems."² A fact cannot be considered in isolation; the need for theory to analyze and interpret the data, statistical and factual, seems obvious. The true relation between facts and theory is a complementary one. Accordingly, we find that there is no "true" answer to the question, "which comes first in the scientific process, fact-gathering or theorizing?" They progress together. Broadly speaking, the theory is both an arrangement and interpretation of facts, or an analysis of common behavior. What we seek thereby are the principles which may be put for future analysis.

Yet, according to Byers, in the discipline of economics, the nature and the source of theory are not very generally understood. Parsons points out that economic theory is the name we give to the series of propositions which are deduced, by rigorous attention to possible implications, from the original insights formulated into propositions.³ Theoretical work is defined by Koopmans as consisting of reasoning and the construction of premises from which to reason. The collection of facts is necessarily a selective process. Ideas concerning the relationship of various facts, if stated clearly and formally so that they are testable, may be called hypotheses. They provide a standard for selection as well as a scheme for arranging facts in a useful form and order. On the other hand, ideas and hypotheses themselves are not generated in a vacuum. Observations, even if only of an informal sort, ordinarily contribute to their formation.

The ultimate aim of economic study is, however, not to theorize or to analyze; it is neither curiosity nor the knowledge for the sake of knowledge. Rather, it is the necessity to explore ways and means whereby human welfare can be maximized. In order to discover the principles in the developing and fast-growing economy, more so with increased scientific innovations and technological improvements, investigations have to be made and the data has to be collected, arranged and analyzed. Advances in economic theorizing are made by constantly discarding the "torn-out" generalizations rendered obsolete by the revelation of facts and devising new generalizations which will cover and explain new facts.

In the evolutionary nature of human society, the theoretical systems are not absolute; it is rather an institutional approach. Adam Smith, whose *Wealth of Nations* (1776) is the germinal book of modern economics or political economy, had an atomistic view of society. To him, the society was the sum total of the people in it. Since each man can judge what is best for him better than any government, Smith assumed the prime psychological drive in man as an economic being as the drive of self-interest. Thrilled by the recognition of an order in the economic system, he enunciated the principle of the "invisible hand" or the "divine hand" whereby each individual in pursuing only his own selfish good, was led to achieve the best good for all. And combined with the existence of a natural order in the universe, he concluded from these postulates that the best system was economic liberalism. On the other hand, Commons believed in the early twentieth century that the individuals are not self-sufficient, independent entities and the society is not the summation of the individual members. "Individuals are what they are through their participation in the institutions or going concerns of which they are members."⁴ Thus, the ideas of Commons are grounded in his conception of social relations and accordingly he proceeds from a postulate of the economy as a social organization rather than as a mechanism or organism.

It follows from above that there has come to be recognized a different premise for economic theorizing. The traditional theoretical structure was considered to explain adequately the economic conditions of earlier days. But as time lingered on, the evolutionary process brought in new problems which demanded a new look; the older theories dealing with earlier cause-and-effect relations of economic phenomena in general could not cope with new economic problems and they had to yield before new economic analysis. The old economic theorizing, then, became a past historical interlude. The new economic outlook required a fresh, coordinated interpretation and so a change was enunciated in the realm of economic thought.

The change in premises, therefore, requires fertilization of thought which grows out of a fresh attack upon new developments and a new theoretical structure is erected. These theories not only bridge the gulf between the basic economic theory and economic policy but also help in the formulation of new economic policies based upon the changed economic environment. For example, institutionalism uses the theory of capitalism as a springboard for recommendation of economic policies in an institutional set-up. It stands for a unified economic theory, instead of diffused ones, for various fields of economy. The need for change is justified because of the change in environments from the time when traditional theories were formulated.

In Veblen's view, it is not that the economists' inquiry isolates material civilization from all other phases and bearings of human culture and so to study the motions of an abstractly conceived "economic man". On the contrary, he points out that no theoretical inquiry into this material civilization that shall be at all adequate to any scientific purpose can be carried out without taking this material

civilization "in its causal and genetic relations to other phases of the cultural complex."⁵ But a study which is exclusively to be concerned with human nature under given and stable institutional conditions can achieve static results only. An adequate theory, on the other hand, has of necessity to deal with man's habitual relations to his fellows in society. An individual always lives in a social relationship. Being of an institutional character, these social and habitual relations vary as the institutional scheme varies. "The wants and desires, the end and aim, the ways and means, the amplitude and drift of the individual's conduct are functions of an institutional variable that is of a highly complex and wholly unstable character", writes Veblen.⁶

A question may be asked as to why the change is enunciated in the economic sphere. Or, to phrase the question slightly differently, why changes have to be made in economic analysis? Since economic analysis reveals the rules and principles of economic relationships under given circumstances, a part of the answer lies in the fact that because of the complexity of human and social behavior, it is difficult to obtain the kind of precision in economic theoretical framework as is being obtained in a few of the physical sciences. An economist simply cannot perform the controlled experiments of the chemist or biologist. The laws and principles of economics, therefore, are not as universal as are some of the laws of physical sciences. And a part of the answer is also to be found in the evolutionary and developing nature of social sciences and the basic assumptions made therein, although the physical sciences are also not quite immune from this process. Newtonian theories have become obsolescent with the new discoveries made by Einstein and others and with the new concepts of space, time, and nuclear physics. The science of physics has developed and progressed, and many of Newton's basic assumptions and their derivative theories, held for a long time as authoritative, have now been discarded. So is the case with scientific point of view between pre-Darwinian and post-Darwinian times. In case of social sciences, which cannot be subjected to harsh, rigorously-controlled laboratory system, the changing pattern of life and habituation have much to explain for changing emphasis over the course of years. The characteristic feature by which post-Darwinian science is contrasted with what went before is a new distribution of emphasis whereby "the process of causation, the interval of stability and transition between the initial cause and definitive effect, has come to take the first place in the inquiry instead of that consummation in which causal effect was only presumed to come to rest."⁷ This change of the point of view was not abrupt or catastrophic.

According to Veblen, because the prime postulate of modern scientific inquiry is of consecutive change, it can come to rest only provisionally. Things change consecutively, and therefore every goal of research is necessarily a point of departure. This implies that there cannot be anything static; it has to be evolutionary and transitional. The human life is a dynamic one, and the social sciences being engaged in its behavioral aspects have to take due cognizance of it. Because of its transitional character, any theory based on its premises

could at best be a transitional one. The need for change with the evolution of society and economic progress is, therefore, apparent.

Although the institutionalists have a different approach to economic problems, they do not repudiate basic economic theory. The fundamentals of traditional economics, and also of the neoclassical economics, are accepted, but are put in a larger setting of the evolving economic system. Clark has, as the end-product of his scientific analysis, a theory of our mixed enterprise system whose proportions of public and private enterprise change with the times. According to Hamilton, the value theory, aside from some accidental statements regarding the organization of industry upon the principle of free competition, is a specialized subject of inquiry with as little right to the dignity of economic theory as the theory of money or of accounting. He lays down five tests for any body of doctrine which aspires to be an economic theory and points out that only the institutional economics meets these tests—

1. Economic theory should unify economic science.
2. Economic theory should be relevant to the modern problem of control.
3. The proper subject matter of economic theory is institutions.
4. Economic theory is concerned with matters of process.
5. Economic theory must be based upon an acceptable theory of human behavior.⁸

According to Commons, the early nineteenth century economists patterned their work upon the materialistic sciences of physics and chemistry, instead of on a volitional science of the human will. It was formerly considered, as stated above, that individuals acted like atoms. This factor has since undergone a transformation. "The free bargaining transactions among individuals were the legal foundations of the early science of economics."⁹ These have increasingly been replaced by collective action. As Commons puts it, "Collection action means more than mere 'control' of individual action. It means liberation and expansion of individual action; thus, collective action is literally the means to liberty."¹⁰ This collective action was condemned by classical economists, and even court decisions till a few decades ago have been against collection action in many countries.

Similarly, the banking and credit system has replaced the barter economy of traditional economics. Free competition and its underlying assumptions are no more valid in the modern world. Instead, Commons has come forward with five assumptions or hypotheses after his experience in collective action. These are sovereignty, scarcity, efficiency, futurity, and custom. According to him, these are logical assumptions made for the purpose of attaining systematic interpretation and understanding in a world of diversity. These are therefore the mental tools for purposes of investigations and are considered as elementary assumptions with which human beings unconsciously or habitually guide their economic activities. At the same

time, Commons recognizes that each individual, each race of individuals, each corporation or labor union is a special case where only special investigations can ascertain and explain the relative predominance of the several simplified assumptions which serve as clues or mental tools to enable the investigator to find his way.

We have thus observed different points of view: those advanced by the classical economists and also those found in the neoclassical and institutional economics. In all fairness to the classical economists, it can be stated that they were also seeking to explain the broad basic principles as they perceived economic environments. Smith's principles and their elaboration, the notion of "divine hand" which guides each person in pursuing his own gain and thereby to contribute to the social welfare, Malthusian theory of population, Ricardian theory of rent, to name only a few, have since been modified. For example, Smith's notion of "divine hand" led him to believe that any interference with free competition by government was almost certain to be injurious. While Smith did recognize some of the realistic limitations on this doctrine, it was not until later that the economists discovered the truth: the virtues claimed for free enterprise are fully realized only when the complete checks and balances of "perfect competition" are present. As Max Lerner has pointed out that although the *Wealth of Nations* is undoubtedly the foundation work of modern economic thought, yet you can pick it to pieces and find that there is nothing in it that might not have been found somewhere in the literature before and nothing that comes out of it that has not to a great degree been punctured by the literature that followed." A person's thinking is shaped by his inward beliefs, conscious and/or subconscious, and there are as many preconceptions as postulates. For instance, taking the case of Ricardo, we find that he assumed as permanent and universal the physical environment, social organization, industrial techniques, and human nature, as he saw it in England and yet his system was not "perfect" as pointed out by Newman. However, Ricardo made a great start in systematizing economic theory.

And again, the problems and premises change over the course of time. At the time Adam Smith wrote his masterpiece, the chief economic problem was man's struggle to conquer nature in the production of material wealth. As a matter of fact, historically, the production of goods and rendering of services has been the most important and pressing economic problem. Through his historical career, man has labored hard to produce the necessities of life, becoming an expert in "brinkmanship" in the process. In the period following Adam Smith, the problem of production continued to be an urgent one, but it became overshadowed by the problem of distribution. Ricardo's *Principles of Political Economy and Taxation*, published in 1817, sets forth as its aim the discovery of the principles that govern the distribution of national incomes among different classes of society. Just as the opulence of modern times has diminished the urgency of the problem of production, so it has made possible great contributions to the solution of the problem of distribution. Neither production nor distribution is however, any longer the economic problem in the west-

ern world, though it continues to be the single most important problem in a large number of countries in the world. On the other hand, in the modern view, the basic problem is how to allocate given resources among different uses so as to maximize consumer satisfaction. And though Malthus had developed the concept of "effective demand", a century passed before Keynes brought it to the public notice, and it stirred the imagination of the people. The concept of effective demand could not gain wide popularity because of the "lack" of knowledge of economic problems and their complexities.

Yet in spite of all their deficiencies and shortcomings, the science of economics is proud of its founders. The basic reason why economics was not an evolutionary science is that the requisite premises and the point of view had been wanting. According to Veblen, "the process of change is a gradual one: economic science began with the study of what had happened in the past, then moved to what is now happening in the present; finally, it is concerned with the hopes and fears of what may be expected to happen in future time."¹¹ The classical economists were not clear cut on these time dimensions. All of them took past, present, and future for granted, without investigation, just as time was taken for granted in the physical sciences** before the incoming of the recent theories of relativity. Commons has pointed out that one reason why early economists did not separate out future time for special investigation in their theories of value was the assumption, taken from the physical sciences, that "cause precedes effect . . . labor precedes its product, sensations precede action . . . But here is an effect that precedes its cause."¹²

In conclusion it can be stated that economic theories reflect the thinking of persons as they perceive the economic environment.†

**Dr. Vannevar Bush, honorary board chairman of M.I.T. says that as a matter of simple fact "science never proves anything in an absolute sense. It accumulates data by observation and measurement. From an assemblage of such data the scientist constructs a hypothesis, a formula that expresses the relationships he finds." As soon as further observation shows that the working hypothesis is faulty, it is replaced by another which seems more nearly correct. "Fortunately, scientific endeavor does not have to be perfect to yield results. The magnificent structure of dynamics was based on a differential calculus that was logically full of holes." Kepler's laws explaining planetary motion were based on calculations now shown to be mere approximations. Even the Euclidean underpinnings of Newton's iron law of gravitation have become only one of the possible systems of geometry. For future details, see *Times*, The Weekly Magazine, Vol. 85, No. 19, May 7, 1965, p. 81.

†The small band of U.S. thinkers who are today developing "process theology" believe that the way to discover a God compatible with the findings of physics and psychology is to assume that God himself is in a process of change and growth. See *Times*, *Ibid.*, p. 68.

Dr. Bush points out that many people believe that "scientists can establish a complete set of facts and relations about the universe, all neatly proved, and that on this firm basis men can securely establish their personal philosophy, their religion, free from doubt or error." All this, however, is a crass misconception. Dr. Bush explains that so exaggerated a faith in the powers of science is a residue of a naive 18th century belief in absolute "Laws of nature, based on observation and measurement." *Times*, *Ibid.*, p. 81.

These are influenced by their preconceptions and inward beliefs, conscious and/or subconscious, and these are seldom, if ever, subjected to searching examination. As the evolutionary process goes on, the "old" theories have to be modified because of the changed nature of problems and their premises. The old assumptions have to be discarded, and new ones have to be worked out. All institutions are subjected to evolutionary development and growth.

Theorists and theories are products of their own times. To understand them, we must understand their environmental context.

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The Development and Status of Industrial Arts in Georgia Schools

by

Clyde W. Hall

The rise of industrial arts in Georgia has roughly followed the same course it has taken in many other states, but probably during its early years at a much slower pace. The retardation of this program during its formative stages in Georgia can be attributed to many things, but possibly its greatest obstacles were caused by the economic structure and cultural composition of this state. It is well known that Georgia was a major cotton producing state long before and after the Civil War, and that its people possessed many deep-seated agrarian ideals which have, until recently, hampered the industrial development of the state with the largest land area east of the Mississippi River.

Industrial arts, being an urban industrial subject, has remained for a long time in the shadows of agricultural education in Georgia; however, it has evolved from manual training as conceived in the late 1870's by Calvin M. Woodward and John D. Runkle, and has passed through the manual arts stage of Charles A. Bennett to its present form here the same as it has in other states. This educational evolution had its beginning in Georgia at Atlanta University in 1883. At which time, Clarence C. Tucker introduced manual training to the male secondary pupils of that private Negro institution for its educational and exploratory possibilities. His three-year program consisted of a combination of courses in woods and metals which met seven and a half hours per week and included basic hand tool operations in those areas. This program was so successful that a three-story brick structure was erected to house it in 1884 and it became a required subject of all male students at that school.¹

Charles H. Ham² made a study of manual training in the United States between 1883-1898 and found 101 public high schools in 23 states, 54 public primary schools in 20 states, 35 private schools in 12 states, and 17 public normal schools in 14 states offering manual training to predominately white student bodies. However, only one of these schools was located in Georgia and that one was Georgia Normal and Industrial College at Milledgeville, Georgia, which is now called Georgia State College for Women. This institution has a very rich history of pioneering in the practical arts. The law passed in

¹W.E.B. DuBois, ed., *The Negro Artisan* (Atlanta: Atlanta University Press, 1902), pp. 33, 61.

²Charles H. Ham, *Mind and Hand: Manual Training the Chief Factors in Education* (New York: American Book Company, 1900) pp. 387-395, 397-401.

1889 establishing this college specified that first class normal and industrial training should be provided college women at this institution. Manual training was established there in 1891, and Ham found during his investigation that 15 teachers taught this course and 284 pupils were enrolled. This institution, in 1906, was also the first institution in the South to offer home economics as a normal course and to award a diploma in this area. As late as 1922, the President of Georgia Normal and Industrial College reported to the State Department of Education that persons were being graduated from his institution qualified to teach manual training.³

Between 1883-1898, Ham⁴ reported that 69 institutions for Negroes in 21 states and the District of Columbia offered manual training to their students. Eight of these institutions were in Georgia and were private institutions supported mainly by agencies outside the state.

The presence of manual training in so many more Negro institutions than whites in Georgia during this early period can be attributed mostly to the following three factors:

1. The activities of this discipline generally followed closely many of the jobs which Negroes performed as slaves on the plantations before the Civil War. Generally speaking, they were the artisans of this region at that time, and there was a feeling among many former plantation owners of this state and others that this tradition should be continued.
2. The private schools which offered this work such as Atlanta University, Spelman Seminary, Ballard Normal and Industrial School, and Beach Institute were primarily financed by philanthropists from the North who had industrial backgrounds which caused them to have a feeling for this type of education. These people established funds which fostered industrial training in many Negro schools during this period. The John F. Slater Fund is a typical example of this. It was established in 1882 by a wealthy manufacturer from Connecticut for the purpose of aiding southern school authorities with the development of comprehensive systems of schools for Negroes.⁵ Many manual training programs in Negro institutions were chiefly funded by this source between 1882-1903.⁶ However, when this money was withdrawn at the close of the above period, practically all these manual training programs went out of existence and those in Georgia were no exception.
3. Possibly the greatest impetus given manual training in Negro institutions near the turn of the century was an address de-

³*Fifty-First Annual Report of the Department of Education to the Georgia Assembly of the State of Georgia for the School Year Ending December 31, 1922*, p. 221.

⁴Ham, *op. cit.*, pp. 396-397.

⁵"The John F. Slater Fund," *Southern Workman*, LXII (June, 1933), 280.

⁶Willard Range, *The Rise and Progress of Negro Colleges in Georgia, 1865-1949* (Athens: University of Georgia Press, 1951), p. 75.

livered by Booker T. Washington, founder of the famous Tuskegee Institute, at the Cotton State Exposition in Atlanta in 1895. This occasion lifted him to national prominence because of his advocacy of the Negro casting down his bucket in the South and learning the dignity of labor and the thrift of honest toil.⁷ However, there was some opposition to Washington's philosophy but many manual training and trade programs came into existence because of it.

Even though Georgia passed appropriate legislations in 1858 and in 1868 to establish free schools in the state, very little was done in this regard until the adoption of the Constitution of 1877. At this time, provisions were made to earnestly support elementary schools for both races through taxation and other means.⁸ The first evidence of statutory support for manual training in Georgia schools came from the Legislature in 1885. Legislation authorized and recommended school boards to introduce manual training in the public schools, but it had very little practical effect in either the Negro or white schools.⁹

The first significant form of manual training in white public secondary schools appeared indirectly in the twelve congressional district agricultural and mechanical schools established in 1906. The Honorable H. H. Perry, of Gainesville, introduced a bill in the State Legislature which provided the machinery and support for these schools to be organized in Statesboro, Tifton, Americus, Carrollton, Monroe, Barnesville, Powder Springs, Madison, Clarkesville, Granite Hill, Douglass and Cochran.¹⁰ These district agricultural and mechanical schools attempted to provide for the white youth of Georgia a high school education and vocational training in an agricultural environment during a four year period. Prior to 1924, when the complexion of these institutions started changing because of the rapid rise of other public high schools in the state, carpentry appeared to be the best organized industrial subject offered. At times, this subject possessed qualities of a manual training course, and, at others, it appeared to be purely a vocational course organized to help these schools build and maintain their physical plants. Between 1924 and 1933, six of these institutions went out of existence and six were advanced to institutions of higher learning. Georgia Southern College at Statesboro, which came into existence as the First District A. & M. School, had a mechanical course which has developed into one of the leading industrial arts programs of this state.

With the coming and passing of World War II, and with a great migration of persons from rural areas to the urban centers, Georgia started shifting from an agricultural state to an industrial empire.

⁷E. Davidson Washington, *Selected Speeches of Booker T. Washington* (Garden City, Doubleday, Doran and Company, Inc., 1932), pp. 31-36.

⁸John C. Meadows, *Modern Georgia* (Athens: University of Georgia Press, 1946), pp. 139-141.

⁹Ham, *op. cit.*, p. 403.

¹⁰*Fifty-First Annual Report, op. cit.*, pp. 22, 31.

Georgia, as well as the entire nation, became conscious of the many disadvantages of the little red school house with its rich history and pleasant memories, and began initiating programs to consolidate its schools into larger and more meaningful educational units. In 1949, Georgia passed a Minimum Foundation School Law which has revolutionized education in this state, and industrial arts has been a part of this revolution.¹¹

The acceleration of industrial arts programs under the Minimum Foundation School Law can be greatly attributed to the tranquility and cooperation which exist in Georgia between the people in industrial arts education and those in vocational education. The Georgia Division of Vocational Education has given industrial arts its unusual support and has included it as a facet of its activities. Because of the hostility which exists between these two groups, such a union is almost unthinkable in many other states.

An example of this cooperation was vividly exhibited in 1952, when the Division of Vocational Education discovered during an investigation that 90 percent of the new school buildings approved under the Minimum Foundation School Law had no planned facilities for industrial arts, although a School Building Authority was established under this Law to insure the construction of modern school buildings for up-to-date functional educational programs. As a result of the concern of the Division of Vocational Education, a committee was formed of state officials, teacher trainers, school superintendents and industrial arts teachers to study this problem and take action concerning it. This committee, after making a careful study, developed and distributed a bulletin containing recommendations for industrial arts facilities in the public schools of this state.¹² These recommendations in a revised form were later included in the State Department of Education's publication *A Guide for Planning and Construction of School Facilities in Georgia*, which is widely used by local school officials and architects when planning new school plants. Practically all new secondary school plants now constructed in this state have some facilities for industrial arts.

Another great step forward in industrial arts in Georgia was taken when the Division of Vocational Education in 1958 created the position of Consultant for Industrial Arts and employed Raymond S. Ginn, Jr., as its first consultant. This office has nurtured this subject in the public schools by collecting and disseminating information concerning this area, by assisting with the certification of industrial arts teachers, and, above all, by administering the unique equipment aid program for industrial arts which was started in 1960 with a \$20,000 allocation from the Division of Vocational Education and grew to a fund of \$200,000 in 1964 to be matched by local school systems for the purchasing of industrial arts equipment.

¹¹Donald F. Hackett, "The Status and Need for Industrial Education in Georgia" (Unpublished Doctor's dissertation, The University of Missouri, 1953), p. 9.

¹²*Ibid.*, pp. 9-10.

The technical complexion of industrial arts in the secondary schools of this state has been shaped largely by institutions of higher learning within its borders. The entrance requirements of these schools, as well as their graduates, have determined to a great extent the areas of specialization in the industrial arts programs at the secondary level.

Mechanical drawing has recently become a very prominent industrial arts course in the secondary schools of the urban centers, largely because of entrance and curricular requirements at Georgia Institute of Technology. At one time, drafting was stressed in engineering education and was a skill one expected to develop while enrolled in a professional engineering curriculum, but today engineering schools, and Georgia Tech is no exception, expect freshmen to possess certain basic drafting skills when they enroll. This being true, many youngsters in the large cities of the state have requested drawing as an elective in their secondary programs because of their interest in Georgia Tech. The industrial arts offerings of the high schools of Atlanta and DeKalb County vividly reflect this need.

Savannah State College has almost singlehandedly shaped the technical content of predominately Negro industrial arts programs. A vast majority of the Negro industrial arts teachers in this state were graduated from Savannah State College since World War II. Even though this college was founded in 1890 under the Morrill Acts of 1862 and 1890 and introduced a manual training course as early as 1892,¹³ it conferred its first degree in industrial arts under the umbrella of industrial education in 1948. The author was the recipient of that degree. To a great extent until 1961, graduates of this industrial education program had received mostly specialized vocational training in auto mechanics, masonry and woodwork, and these were the areas which they most frequently established in the industrial arts programs in Negro secondary schools where they worked. However, this situation began changing in 1960 when the equipment aid program promoted the introduction of the areas of metals and electricity and the composite industrial education program at Savannah State College was replaced in 1961 with specialized programs in industrial arts education; trade and industrial education.

Donald F. Hackett,¹⁴ in his study of industrial arts programs in white schools of this state in 1952-53, revealed that most of the teachers in these programs were graduated from Georgia Southern College (Georgia Teachers College), Martha Berry College and University of Georgia, and the most frequently offered course was a general shop course with a woodworking core. This course reflected greatly the offerings of the above schools at that time, and as these institutions have diversified their programs, a greater variety of technical content can now be found in general shop courses in the predominantly white secondary schools of this state.

¹³Range, *op. cit.*, p. 72.

¹⁴Hackett, *op. cit.*, pp. 21, 31.

The approved program approach for the certification of teachers in Georgia has greatly helped to expand and standardize industrial arts substance in all schools of this state. This system necessitates the establishment of criteria governing pre-service educational programs of teachers. These criteria are developed by personnel from the teacher training institutions in the state, in cooperation with public school officials and teachers, and the State Department of Education staff. They are used by the State Department of Education to approve or disapprove teacher training programs. Once a program is approved, graduates of the program are automatically certificated when they are recommended by the institution involved.

Criteria for industrial arts programs under the above arrangement were first developed in 1953 and were later revised during the early part of 1964. The current criteria require institutions preparing industrial arts teachers to make all candidates functional in drafting, woods, metals, electricity-electronics, and power mechanics or graphic arts. These candidates are expected to teach the above technical areas in grades 7, 8, and 9 as exploratory and discovery experiences and in grades 10, 11, and 12 as occupational preparatory training for some learners and foundation training for advanced study for others. These standards will plot the course and shape the destiny of industrial arts in Georgia schools for several years to come.

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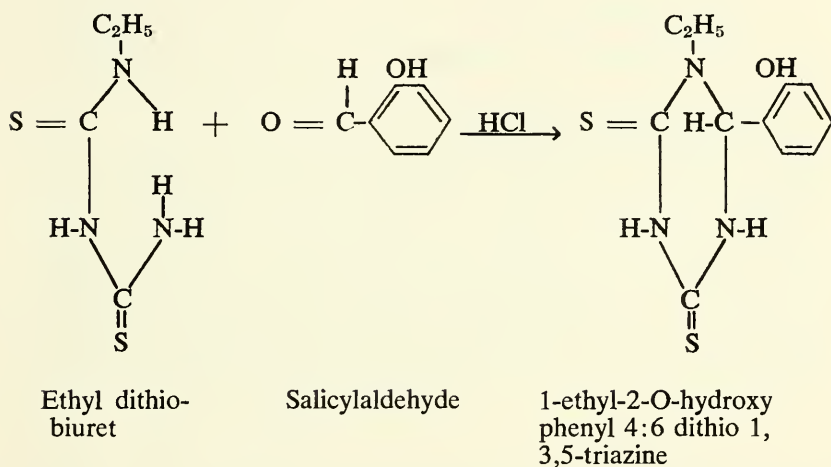
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Synthesis of 4:6 Thio 1, 3, 5-triazine Derivatives (I)

by

Kamalakar B. Raut

The present work describes the synthesis of 4:6 thio 1,3,5-triazine derivatives for biological studies, by condensation of 1-ethyl dithio-biuret with different aromatic aldehydes. The reaction takes place as follows:



Experimental

A mixture of ethyl dithiobiuret and salicylic aldehyde [1:1] in ethanol was cooled to 0°C. Dry hydrogen chloride gas was passed through this mixture for thirty minutes. The reaction mixture was poured in 1N sodium hydroxide, warmed to 50° and filtered. The filtrate was acidified with dilute acetic acid and cooled overnight. The solid that precipitated was separated by filtration and crystallized from ethanol or ethyl acetate.

Similarly, other derivatives were prepared.

With ethyl dithiobiuret, the following aldehydes were condensed.

<i>Aldehyde</i>	<i>M.P. of the Product</i>
1. Salicylaldehyde	228°C
2. m-hydroxy benzaldehyde	171°C
3. m-chloro benzaldehyde	230°C
4. p-tolu-aldehyde	227°C
5. Veratric aldehyde	226°C
6. 5-Bromovanillin	224°C
7. Vanillin	226°C
8. Anisaldehyde	227°C
9. p-dimethylamino benzaldehyde	222°C

Further work is in progress.

Flow Parameters Behind Three Dimensional Shock Wave

by

Nazir A. Warsi

1. INTRODUCTION

The jump conditions for the flow of a perfect gas in Lagrangian Coordinate system is given by [1]

$$(1.1) \quad [\mathbf{u}^i] + h_{n/} [\tau] \times^i = 0$$

$$(1.2) \quad [\mathbf{p}] + h_{n/} [\mathbf{u}^i] \times^i = 0$$

$$(1.3) \quad [\frac{1}{2} v_{n/}^2 + I] = 0$$

In order to determine the flow parameters behind the shock wave we take help of the idea of the shock-strength. The strength of the shock is defined as the ratio of the change in any flow parameter from the backside to the frontside to the flow parameter in front of the shock surface. The idea of shock strength is important from the physical point of view as it determines whether the shock is weak or whether it is to die out soon. As the values of a parameter in two regions approach one another, the discontinuity is removed and the shock dies out. According to the definition of the shock strength if F is a flow parameter, we have

$$(1.4) \quad \delta_F = [F] / F_1$$

where $[F]$ stands for $F_2 - F_1$. In particular the specific volume strength $\delta\tau$ is given by

$$(1.5) \quad \delta\tau = [\tau] / \tau_1$$

2. FLOW PARAMETERS.

We have the following theorems.

THEOREM: 2.1: *The law of conservation of mass in terms of $\delta\tau$ is given by*

$$(2.1) \quad [\mathbf{u}^i] = -h_{n/} \delta\tau \tau_1^2 \times^i$$

PROOF: In virtue of (1.5), (1.1) gives (2.1).

COROLLARY 2.1: *The equations (2.1) are equivalent to*

$$(2.2)a \quad [u_{n/}] = -h_{n/} \delta\tau \tau_1$$

or

$$(2.2)b \quad [u_{n/}] = \delta\tau v_{1n/}$$

or

$$(2.2)c \quad [u_i] = \delta \tau / V_{1/i} \chi^i$$

and

$$(2.3) \quad [u_d] = 0$$

PROOF: Multiplying (2.1) by X^i and summing with respect to i , we get (2.2)a. With the help of the relation $-h_{n/} \tau_{1/} = V_{1n/}$, equation (2.2)a gives (2.2)b which is evidently equivalent to (2.2)c.

Multiplying (2.1) by $x_{1/d}$ summing with respect to i and using the fact that

$$(2.4) \quad \chi_{1/d}^i \chi^i = 0,$$

we get (2.3).

COROLLARY 2.2: For a stationary shock wave, we have

$$(2.5) \quad [u_{n/}] = \delta \tau / u_{1n/}$$

PROOF: For a stationary shock wave $\bar{u}_{n/} = 0$. Therefore, putting $v_{2n/} = u_{2n/}$ and $v_{2/i} = u_{2/i}$ in (2.3)b, we get (2.5).

THEOREM 3.2: The law of conservation of momentum can be put in the form

$$(2.6)a \quad [p] = \dot{h}_{n/} \delta \tau / \tau_{1/}$$

or

$$(2.6)b \quad [p] = -\dot{h}_{n/} \delta \tau / V_{1n/}$$

or

$$(2.6)c \quad [p] = -\dot{h}_{n/} \delta \tau / V_{1/i} \chi^i$$

which, for the stationary shock, reduces to

$$(2.7)a \quad [p] = -\dot{h}_{n/} \delta \tau / u_{1n/}$$

or

$$(2.7)b \quad [p] = -\dot{h}_{n/} \delta \tau / u_{1/i} \chi^i$$

PROOF: Multiplying (1.5) by X^i and summing with respect to i , we get

$$(2.8) \quad [p] + \dot{h}_{n/} [u_{n/}] = 0$$

which, in consequence of (2.2)a gives (2.6)a. Equation (2.8) also gives (2.6)b if the value of $[u_{n/}]$ is substituted from (2.2)b. Obviously, (2.6)b is equivalent to (2.6)c.

For a stationary shock, $V_{1n/} = u_{1n/}$ and $V_{1/i} = u_{1/i}$

Hence, (2.6)b and (2.6)c reduce to (2.7)a and (2.7)b respectively.

THEOREM 3.3: The law of conservation of energy at the shock surface can be put in the form

$$(2.9)a \quad [I] = -\frac{1}{2} \dot{h}_{n/}^2 \delta \tau / (\delta \tau / + 2) \tau_{1/}^2$$

or

$$(2.9)b \quad [I] = -\frac{1}{2} \delta \tau / (\delta \tau / + 2) V_{1n/}^2$$

which, for the stationary shock, reduces to

$$(2.10) [I] = -\frac{1}{2} \delta z / (\delta z / + 2) U_{1n}^2$$

PROOF: (1.3) gives (2.9)a if (1.5) is used. The relation $-h_{n1} \tau_{11} = V_{1n1}$ reduces (2.9)a to (2.9)b. For a stationary shock $V_{1n1} = U_{1n1}$. Hence, (2.10) is obvious from (2.9)b.

THEOREM 3.4: *The specific volumes on the two sides of the shock surface are related by the equation*

$$(2.11)a [\tau] = -\frac{\delta z /}{h_{n1}} V_{1n1}$$

or

$$(2.11)b [\tau] = -\frac{\delta z /}{h_{n1}} V_{1/i} \chi^i$$

which, in the case of a stationary shock, reduce to

$$(2.12)a [\tau] = -\frac{\delta z /}{h_{n1}} U_{1n1}$$

or

$$(2.12)b [\tau] = -\frac{\delta z /}{h_{n1}} U_{1/i} \chi^i$$

PROOF: Substituting $\tau_{11} = -V_{1n1}/h_{n1}$ in (1.5), we get (2.11)a which is obviously equivalent to (2.11)b. For a stationary shock $V_{1n1} = U_{1n1}$ and $V_{1/i} = U_{1/i}$. Hence, we get (2.12)a and (2.12)b.

THEOREM 3.5: *In the case of unsteady flow of a polytropic gas is given by, $\delta z /$*

$$(2.13) \delta z / = \frac{2}{\gamma+1} \frac{C_{11}^2 - h_{n1} \tau_{11}^2}{h_{n1}^2 \tau_{11}^2}$$

PROOF: In the case of a polytropic gas, the energy and specific enthalpy equations are written as

$$(2.14) e_{\alpha1} = p_{\alpha1} \tau_{\alpha1} / (\gamma - 1)$$

and

$$(2.15) I_{\alpha1} = e_{\alpha1} + p_{\alpha1} \tau_{\alpha1}$$

respectively. (2.15), by virtue of (2.14), gives

$$(2.16) I_{\alpha1} = \frac{\gamma}{\gamma-1} p_{\alpha1} \tau_{\alpha1},$$

which gives

$$(2.17) [I] = \frac{\gamma}{\gamma-1} [p\tau].$$

If τ_{21} , p_{21} and $[I]$ are eliminated from (2.17) with the help of (1.5), (2.6)a and (2.9)a, then an equation containing $\delta z /$ and the flow and thermodynamic parameters of region 1/ is obtained. This equation gives the value of $\delta z /$ as shown in (2.13).

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Ability Grouping: The Pros and Cons

by

John W. Jordan

The purpose of this study is to focus on a central problem in American education and society, namely, the dilemma of the grouping of students in different classes. The scope of the study will cover many facets of the controversy surrounding the issue of ability grouping in the American educational system.

The task of determining whether it is best to group students homogeneously or heterogeneously according to ability poses two immediate problems. First, which method or type of grouping will yield the greatest possible gains for the majority of the students without any detrimental effect on others? It is the broad nature of this problem that piques the concern of educators; the concern is for the gains or advantages of all students, and not just a few that may be helped while others may be hindered.

Secondly, what criterion is to be used to measure the gains of one type of grouping against another; what is the mandate or purpose of the American educational system; the function of the school in providing the maximum benefits for all; and the objectives, values, standards, ideals, and norms of education?

The way in which students are grouped in the American school systems has a great effect on the schools, students, and society. In fact, the problem demands that the democratic idea of education be re-evaluated.

Moreover, the controversy of grouping students demands that the problem be treated and delineated immediately if the educational objectives within the school and society are to survive.

The procedure in the treatment of the dilemma of ability grouping will be to focus attention on certain pertinent facts and studies which will reflect the pros and cons of the problem that is upsetting and challenging the rationale of the American school system. The method will be to define important terms, present the issue, survey some relevant literature concerning the problem, measure the results and findings, and draw a conclusion.

In order to understand the problem of ability grouping it will be necessary to clarify three important words that will be used throughout this paper: grouping, ability grouping, and heterogeneous grouping. The word "grouping" has a broad meaning, but as it is used in this paper it has the following meaning:

The act or process of combining all the observations that fall within a given range, bound by the class limits, into a single group, which is then usually treated either as if all the

observations in the group had the same value or as if the observations were distributed evenly over the interval.¹

The synonymous use of homogeneous grouping and ability grouping often creates confusion since the word "homogeneous" is usually used to refer to the classification of pupils for the purpose of forming instructional groups having a high degree of similarity in regard to sex, industry, age, previous experience, ability, and other factors which affect learning. This study is concerned with homogeneity as it denotes grouping according to ability. Chester Harris defines ability grouping as

one of the several devices for bringing students together on criteria of likeness or homogeneity. In ability grouping an attempt is made to divide the students into classes or within a given class according to their ability to attain.²

The type of grouping that is compared with homogeneous grouping is called heterogeneous grouping. It is defined by Carter Good in *The Dictionary of Education* as

the classification of pupils for the purpose of forming certain groups having a high degree of dissimilarity.³

These terms are essential to understanding the consideration of the issue to be discussed in this paper: namely, the pros and cons of ability grouping.

In the educational system of today with the current emphasis on integration of the schools and segregation of the students into special classes according to ability, it is plainly clear that the American educational system is in a state of crisis. Central to the crisis as it affects education society specifically is a national controversy; it is the controversy over how to group students for instructional purposes. Many competent teachers and educators argue vigorously for ability grouping and cite the reasons for their choice. In justifying ability grouping they say that students of widely different academic abilities and reading skills should not be in the same class. They give many valid reasons in support of their hypothesis, but not without stirring old arguments against it; reasoning that justice can only be done to the bright students and the slow students if both receive instruction in the same classes which by their nature should be diversively heterogeneous.

The issue of whether or not students of like ability should be grouped together for instructional purposes has been debated for many years. There is evidence that concern in the issue of ability grouping developed around the 1900's. At that time people paid little attention to adjustment of classes, standards, or subject-matter to individual pupils. With the passing of the public school's com-

¹Carter Good, *Dictionary of Education*, p. 256.

²Chester Harris (ed.), *Encyclopedia of Educational Research*, p. 223.

³Carter Good, *op. cit.*, p. 256.

pulsory school attendance law, the schools were faced with the task of educating all children. To cope with this great change in the educational system, administrators tried to make adjustments by organizing pupils in ability groups. To identify the groups, they were usually referred to as Robins, Bluebirds, and Orioles or X, Y, and Z groups. When ability grouping first came into existence, it should be noted that teachers had little or no knowledge of child growth and learning, and individual differences. They also had very little knowledge of mental ability and their relation to the various school subjects and skills.⁴

One may ask the following questions regarding the grouping of students for instruction. Will students achieve more if they are grouped with children of about the same mental maturity and mental ability? Or are they better off in a group with varying abilities? What is better for the slow learner or for the gifted child—to be with others like themselves or in a mixed group? The evidence for these questions will be considered and answered.

The first consideration will be the argument and evidence for homogeneous grouping:

I. Ability grouping makes a differentiation of curriculums easier. There is a wide range of individual differences in a regular classroom—ability grouping makes the teacher's task easier, and it enables him to adapt methods of teaching to meet the needs of the varying groups.

II. Above average students tend to form habits of idleness, inattention, and mental laziness when in class with average and below average pupils; they may develop a false sense of superiority from a lack of challenge or effective motivation; and underachievement is more likely to occur in the regular classroom.

III. Slower learners in separate groups are not discouraged by superiority of other, but compete on more equal terms—students compete with others of fairly equal ability, and competition is keener for pupils of all groups since the students are more likely to work up to their capacities.

IV. The gifted children in the regular class stimulate the average and below average children at the expense of their own learning.

V. Ability grouping stimulates a new leadership.

VI. Association with other pupils does not insure the development of adequate social and personal relationships—students can be friends outside of the classroom.⁵

⁴Martin Essex, "How Good is Ability Grouping?", *National Parent Teachers*, LIV (September 1959), 14-16.

⁵A. H. Passow, "Enrichment of Education for the Gifted", *Education for the Gifted*, Fifty-seventh Yearbook of the National Society for the Study of Education. Part II. (Chicago: University of Chicago Press, 1958), 193-221.

Evidence has been secured to favor the characteristic argument of ability grouping. Some trials of ability grouping show favorable evidence, although, in the many cases, the originator of the study was the judge. The evidence and research are indecisive, and a look at some of the experiments and findings will illustrate this. Catherine Miles in her review of studies in the field of grouping declared that:

The experimental work with the gifted child in which segregated are compared with non-segregated groups seems to point to the more favorable progress of the former as compared with the latter.⁶

Paul Rankin reports in "Pupil Classification and Grouping" that Worlton did a study dealing with bright pupils in 1924. He compared 714 pupils in homogeneous classes with 426 in heterogeneous classes in one large school, with 326 pupils in heterogeneous classes in one large school which had adopted ability grouping, and with 766 pupils in heterogeneous classes. The chart on the following page presents the essential data from the study. The results of the study show that with one exception the means for the homogeneous groups were higher than the means for any of the three types of heterogeneous control groups.

The pupils in homogeneous groups excelled those in mixed groups in practically all levels of ability which were studied.⁷ It should be noted that this study is too short and the data too little to be completely convincing. Furthermore, the slight advantage of ability grouping in this study is not enough to be significant.

A. G. Breiderstine presented evidence in favor of ability grouping. The data was on differentiated and undifferentiated groups. He concluded that pupils of high intelligence did slightly better when in classes where differentiation is not practical than when in differentiated groups; pupils who are average in ability do as well in segregated as when in mixed classes. The dull pupils in differentiated classes excell in comparison with their mates in undifferentiated classes. Virtually, the study concludes that the undifferentiated were slightly superior to the differentiated except for a few isolated grades.⁸ This study shows that ability grouping is not entirely advantageous for all grades—it brings in a weakness that is not solved by ability grouping, that is, the study did not show advantages in ability grouping for all students and the results are generally inconclusive.

⁶Catherine Miles, "Gifted Children", *Manual of Child Psychology*, (ed.) Leonard Carmichael, 1032.

⁷Paul Rankin, "Classification and Grouping", *Review of Educational Research*, Part I. (1931), 18.

⁸A. G. Breiderstine, "The Educational Achievement of Pupils in Differentiated and Undifferentiated Groups", *Journal of Experimental Educational*, Vol. V. (1936), 91-135.

WORLTON

Number of Pupils, Mean Achievement Scores, and Standard Deviations for Pupils of Various Intelligence Levels Taught in Homogeneous Classes, in Heterogeneous Classes, and in School X and Comparable Salt Lake City Scores for January 1924.

Intelligence Group	Homogeneous Grouping				Heterogeneous Grouping				School X		Salt Lake City January, 1924	
	Number of Pupils	Mean	Standard Deviation	Number of Pupils	Mean	Standard Deviation	Number of Pupils	Mean	Standard Deviation	Number of Pupils	Mean	Standard Deviation
90-99	94	111.97	10.05	78	108.84	10.36	57	106.15	8.93	200	97.4	
100-109	151	114.59	10.47	124	113.72	11.14	103	109.32	9.75	250	103.7	
110-119	191	118.14	9.80	101	116.69	11.96	71	114.12	10.40	176	111.0	
120-129	107	122.51	9.55	56	118.66	12.75	33	117.53	9.27	82	116.0	
130-139	103	121.79	8.34	41	121.62	10.84	36	121.94	8.51	34	119.4	
140-above	68	126.97	9.40	26	124.46	9.23	27	122.88	10.25	24	114.4	
Total	714			426			326			766		
Composite		118.53	9.68		11.26			113.12	9.60		105.61	

A review by H. J. Otto states that evidence slightly favors the use of ability grouping. Studies of gifted children in special classes were described in Part I of the *Twenty-Third Yearbook of the National Society for the Study of Education*. All the studies reported superb academic achievement in ability grouped classes.

More recent evidence in ability grouping tends to say that students differ from subject to subject and that students should be grouped homogeneously in some classes and heterogeneously in others. James Bryant Conant advocates thusly:

In the required subjects and those elected by students with a wide range of ability, the students should be grouped according to ability, subject by subject. For example, in English, American history, ninth-grade algebra, biology, and physical science, there should be at least three types of classes—one for the more able in the subject, another for the large group whose ability is about average and another for the very slow readers who should be handled by special teachers. The middle group might be divided into two or three sections according to the students' abilities in the subject in question. This type of grouping is not to be confused with across-the-board grouping to which a student is placed in a particular section in all courses. Under the scheme here recommended, for example, a student may be in the top section in English but the middle section in history or ninth-grade algebra⁹.

The arrangement as advocated by Conant may help to some extent, but the arguments against the hazards of ability grouping will not be delineated.

In agreement with Conant is R. V. Braham who advocates homogeneous grouping in skill subjects, for the purpose of challenging and meeting the needs of students.¹⁰

One of the many studies investigating ability grouping was done by Rankin in 1927. Approximately 1100 pupils in 36 classes of grade 7B in six intermediate junior high schools were studied. The pupils were high, average, and low on the basis of chronological age, intelligence test rating, and teacher estimation. Eleven or twelve pupils were taken from each of the three groups and placed together in a mixed group. All pupils were administered seven educational tests at the beginning and the end of the semester. The results show that, on the whole, there is a small advantage with homogeneous grouping; low and average groups both gained more in homogeneous sections, but the high groups gained more in mixed groups.¹¹ The findings by Rankin seem to be contrary to the findings of others who say that the high group makes the greatest gain in homogeneous

⁹James Bryant Conant, *The American High School Today*, p. 45.

¹⁰R. V. Braham, "Grouping in the Junior High School", *The National Education Association Journal*, XLVIII (September 1959) 22-23.

¹¹Rankin, *op. cit.*, p. 223.

groups. It was mixed groups, probably, which contributed to the growing demand for more attention to the gifted students and of separating them into special classes for instruction. The evidence seems to show that the bright pupils would surpass the dull ones whether grouped by ability or not; "the gifted child, by his very nature, gets more from an experience than the average or slow child."¹²

Cutts and Moseley say:

Children in special classes for the bright and gifted continue to take full part in the general activities of their schools. The children learn more than children in ungrouped classes.¹³

Considering research shows no significant unanimity of findings, the following survey of some of the available research will illustrate the fact that ability grouping will produce no significant advantages. The arguments against ability grouping will be included in the following studies and findings. The decision, on the part of educators who do not favor ability grouping, to restrict program modification to the regular classroom may be based on considerations of educational philosophy or administrative practicality. As Marian Scheifele puts it, this procedure

permits children of varying abilities to work and play together, to share goals and plans, and to experience achievement through the utilization of each individual's particular ability.¹⁴

A report on a five-year follow-up study in Stockholm by Nils - Eric Svensson provides evidence in favor of heterogeneous grouping. A review of the study shows that the comparability of students was controlled by dividing them into socio-economic groups and by referring to data from an intelligence test and several attainment tests. The purpose of the study as set forth by Nils-Eric Svensson was to determine where different school class-types have varying effects on the attainments (or the amount of gain in attainment) of pupils with similar initial academic qualifications and home background. The subjects for the study were 10,938 pupils from all four grade classes in 1954-55. Data was collected on four subsequent testing occasions from samples taken from the base population; grade 6 (2,400), grade 7 (3,443), grade 8 (2,891) and grade 9 (689). A retest was given to the students one and a half years later and the findings were as follows:

The better students were superior in the Sixth grade; there was no clear significant differences in the Seventh grade; there was no established differences in the Eighth grade; and there was no observed difference in the Ninth grade.¹⁵

¹²A. H. Passow, *op. cit.*, p. 202.

¹³Norma E. Cutts, and Nicholas Moseley, *Providing for Individual Differences in the Elementary School*, p. 71.

¹⁴Marian Scheifele, *The Gifted Child in the Regular Classroom*, p. 45.

¹⁵N. E. Svensson, "Ability Grouping and Scholastic Achievement", *Educational Review*, V. (November 1962), 53-56.

In general, it was found that pupils from higher socio-economic backgrounds had higher test scores than pupils from lower socio-economic backgrounds, but both progressed at about the same rate. (The socio-economic issue in ability grouping will be discussed later in this paper.) The analysis showed that for low ability pupils, total scores in attainment were highest in the least homogenous classes, but in general classes of varying homogeneity were about equal in attainment.¹⁶ This evidence certainly questions the assumption that the attainments of a school class are related to its homogeneity in ability or socio-economic background.

A two-year study by the Talented Youth Project in co-operation with the Board of Education of the City of New York was done in 1956 with the specific purpose of exploring differences in achievement, social and personal relations, interest and attitude toward school of intermediate grade children when grouped in classes with various ranges of intellectual ability. The hypothesis was neither the presence nor absence of gifted pupils, nor the range of abilities in any given classroom, nor the relative position of a particular ability level within the range will affect the attainment of elementary school pupils. The five ability levels as designated were as follows:

gifted	IQ	130 and above
very bright	IQ	120 - 129
bright	IQ	110 - 119
high average	IQ	100 - 109
below average	IQ	99 and below

From these levels of about 3,000 pupils, 15 grouping patterns were organized. Elementary schools in four out of five boroughs were asked to submit the distribution of Otis Alpha IQ scores of their 4th grade pupils. Four pupils with IQ scores above 130 were invited to participate from each school. Many schools were excluded. It was noted that many of the schools excluded were located in culturally disadvantaged areas. The presence of gifted students in the classroom, regardless of ability range, affected the achievement of the other ability levels in science and to a lesser extent in social studies. Where there were gifted students, the other ability levels scored higher in these two subject areas than in classes of equal range where the gifted were absent; the presence of the low-average tended to have a positive effect on the arithmetic computation scores of the other ability levels.¹⁷ The findings of this study seem to cast doubt on the effects of ability grouping per se in raising the academic attainment of pupils because, as has been seen, the results are in favor of heterogeneous grouping.

¹⁶*Ibid*, p. 56.

¹⁷Mirian L. Goldberg and A. Harry Passow, "The Effects of Ability Grouping", *Education* LXXXII (April 1962), 482-87.

The findings of Goldberg and Passow support the argument against ability grouping; in ability grouping, the slow group loses the stimulus and the contribution of the brighter students; furthermore, there are no outstanding leaders to inspire the slower groups.

As Franseth says in her article on ability grouping:

Available research seems to indicate that children supposedly grouped according to ability are no more likely to gain greater achievement than their counter-parts grouped heterogeneously.¹⁸

Purdum made a study of ninth grade pupils taught English and algebra in Michigan. In each school the pupils were divided into two groups from the raw score of the Terman Group Intelligence Test. One group was broken into homogeneous groups; the other into heterogeneous groups. Purdom found that from the total number of 221 pairs, the experimental group on the average made lower gains on two of the four English tests, on one of the two algebra tests, and lower grades in English, but higher grades in algebra.¹⁹ There was no marked difference between the results of homogeneous and heterogeneous groups under the conditions of the experiment.

Van Wagenen studied the effects of segregation upon the achievement of very superior pupils in grades seven and eight; these pupils were really higher than usual, for their IQ's ranged from 120-154. The basis of evaluation was the comparison of their achievement quotients with the achievement quotients of children of like mental age and with approximately the same IQ. No appreciable or consistent differences were discovered.²⁰

Another expression of the results of ability grouping is given by Gray and Hollingworth who studied gifted students in special and regular classrooms. They concluded that the advantages of grouping

lie not so much in expectations of greater achievement in the tool subject as in the enrichment of scholastic experience with additional intellectual opportunities.²¹

The achievement results on their study were about equal.

Lucins and Luchins studied the attitudes of children toward homogeneous grouping. They first noticed that there is a marked differences in social atmosphere between the bright classes and the dull classes. The dull children showed a lack of interest and spontaneity; while the bright children were livelier, happier and full of

¹⁸Jane Franseth, "Grouping Children for Instruction". *School Life*, XL (June 1963).

¹⁹Paul Rankin, *op. cit.*, p. 218.

²⁰*Ibid*, pp. 217-18.

²¹Howard A. Gray and Leta S. Hollingsworth, "The Achievement of Gifted Children Enrolled in Special Opportunity Classes", *Journal of Educational Research*, XXIV (November 1931), 261.

interest. In the study by Luchins and Luchins 190 New York City public elementary school children in the 4th and 5th, and 6th grades were interviewed. Each subject was told that the Board of Education was conducting a study to find what kind of classes children prefer. Five questions were asked. The results appear on the following charts:

<i>Class</i>	<i>Number</i>	<i>(%) Choose Class 1</i>	<i>(%) Choose Class 2</i>
Bright	68	96	4
Average	70	87	13
Dull	52	75	25

Most pupils regardless of status, selected Class 1, the bright group. The following chart shows that the students felt that their parents would prefer that they be in Class 1, the bright group.

<i>Class</i>	<i>Number</i>	<i>(%) Choose Class 1</i>	<i>(%) Choose Class 2</i>
Bright	68	97	3
Average	70	92	8
Dull	52	80	20

A high percentage of the children in the bright group indicated that they would not play with or choose their best friend from the dull group, while mostly those in average and dull groups would choose playmates from other classes and would select a best friend without regard to the superscript of his class.²²

Sister M. Beatrice has the following to say about ability grouping:

I am convinced that homogeneous grouping, handled by teachers desirous of helping children to progress, is a partial answer to meeting the needs of our large classes. A child can be reached in a like group. There is less frustration for the individual. Methods of teaching can be adopted to give maximum results.²³

Byers does not agree with the remarks by Sister Beatrice. She believes that ability grouping causes emotional stress to the segregated students.

The effect on the self-concept of all children involved in homogeneous grouping is especially interesting. Children who are not in the gifted sections evidence feelings of worthlessness and sometimes of rejection. In a society that has

²²Abraham S. Luchins and Edith H. Luchins, "Children's Attitudes Homogeneous Grouping", *Pedagogical Seminary and Journal of Genetic Psychology*, LXXII (March 1948), 3-9.

²³Sister Mary Beatrice, "Homogeneous Grouping Challenges the Teacher", *Catholic School Journal*, LXIII (March 1963), 35.

often been enriched by ideas, inventions, and innovations from people who are not intellectually gifted, should we discourage children who are not intellectually gifted?²⁴

Many others disagree with such statements as made by Sister Beatrice. Notably, among these is Robert E. Bills.

I see homogeneous grouping not as an effort to be beyond subject matter and skills, but as a device for ignoring human variability and for reducing our need to concern ourselves with individual pupils. Once children are homogeneously grouped, we assume that the differences are no longer matters of concern.²⁵

Evidence does not suggest that ability classification removes individual differences. In fact, some educators question whether ability grouping, as developed in most schools, reduces the range of individual variations enough to justify bothering with it. To add to the possible "side-effects" of ability grouping T. Ernest Newland says, "Schools run the chance of losing sight of the child as an individual".²⁶

One reason why regular classroom teachers support ability grouping is that it seems to decrease their regular teaching responsibility and relinquishes their duties to special classes. But providing for the gifted and the slow learner within the regular classroom is an integral part of the teachers' normal task.

The criterion for grouping students is of importance. Sometimes the criterion is general ability as revealed by an intelligence or readiness test. Sometimes ability is merely inferred from past general or specific accomplishments. There are no procedures which are regarded as completely accurate for identifying gifted students. The intelligence test may not test what it purports, or other factors may keep a pupil from reaching his proper level on such a test. Indeed, complete homogeneous grouping is impossible. One reason is that the developmental patterns of children vary widely. Students selected on the basis of general intelligence, for example, may be socially immature or inept in some other key areas. The regular or heterogeneous classroom accepts the unevenness of growth and can insure the kind of experiences which will benefit the total development of each child.

The main fault in using intelligence tests is that only one test is presumably usually used to group students. This problem in education gives birth to the greatest enemy of ability grouping: stagnation in categorization. About this problem Gordon says:

Once we have categorized and classified, this becomes 'it'; we have 'the' answer and need seek no further. In our

²⁴Loretta Byers, "Ability Grouping: help or hindrance to social and emotional growth?", *School Review*, LXIX (Winter 1961), 455-56.

²⁵Robert E. Bills, "Learners or Learning?", *School Life* XLV (June 1963), 10.

²⁶T. Ernest Newland, "Possible 'Side-Effects' of Special Education", *Education*, LXXX (February 1960), 328.

schools this may take the form of . . . administratively expedient grouping of children, even though many children cannot find their proper place in the group.²⁷

Ability groups also have the fault of not being flexible.

Evidence indicated that changes within individuals take place continually so that homogeneity—which might have been obtained when a group was first formed—will continue to move toward heterogeneity.²⁸

The categorization of students by ability often has a detrimental effect on students; the classification becomes a part of them; the teacher treats them as they are labeled; and eventually, they live up to the label. In the case of the average and slow groups, their level of aspiration and achievement are lowered, and many of them are doomed to failure.

Heterogeneous groups undoubtedly have a number of advantages. The strongest claim probably lies in the area of human relations. Students of varying capacities and interest should learn to work together; special classes cheat children of the benefits of living in the society of normal youth; and the interaction of individuals of varying abilities is a part of their education. John Dewey's definition of the school and education is in complete agreement with this idea.

I believe that the school is primarily a social institution. Education being a social process, the school is simply that form of community life in which all those agencies are concentrated that will be most effective in bringing the child into the inherited resources of the race, and to use his own power for social ends.²⁹

Julia Gordon points out that the basis group with which the children spend most of their day should be as heterogeneous as possible, because, if they are to build on the facts that make it possible for them to perceive accurately what people are really like, they need to grow up with as wide a variety of other children as possible.³⁰

The American school system is characterized as being democratic, but homogeneous grouping is described by many educators as being undemocratic, and it tends to create class distinctions in the minds of the pupils. Democratic values are developed and leadership training is conducted best in a situation that fosters social contacts among children of varying backgrounds.

The controversy of ability grouping seems to have strong base in the integration of schools.

²⁷Julia W. Gordon, "Grouping and Human Values", *School Life*, XLV (June 1963), 12.

²⁸Jane Franseth, "Does Grouping Make A Difference?", *Education Digest*, XXVIII (January 1963), 16.

²⁹Martin Dworkin, *Dewey on Education*, p. 22.

³⁰Julia Gordon, *op. cit.*, pp. 12-13.

While people developed the idea that whites had the highest innate intelligence and that other races followed in the order of their departure from white color, with the blackest-skinned Negroes lowest in the scale of intelligence. This idea was supported by some of the earlier intelligence test studies, in which it was found that American Negro children scored lower than American white children with children of mixed white and Negro parentage scoring between the two groups . . . Such group differences as are actually found in studies based on intelligence tests are believed to result from several factors—difference in experience with the particular types of tests, differences in motivation to do one's best on the tests, and possible differences experienced during the pre-school years.³¹

In accordance with the desegregation policy of 1954, many schools adopted ability grouping and opened schools to students irrespective of race, social or economic status. Statistics show that children of families on the lower socio-economic level tend to have lower IQ scores; Negroes are usually on the lower socio-economic level, so that they would have low IQ scores; and when grouped according to ability they are usually in the slow group. These statistics can have a detrimental effect on the educational goals and achievements of the Negro students.

According to Tumin (40) the focus of intelligence as measured by schools is often correlated with race and class diversities. He feels that intelligence as measured by schools has nothing to do with skill performance or with native intelligence. It is his firm conviction that intelligence as measured is a product of one's environmental and educational opportunities.

In many cases the Negro children have been culturally deprived; but if they are given the same chance as others, they can make an equal productive gain in educational and intellectual values.

Talking about something pertinent to grouping Dr. Ahrens says:

Research findings indicate a rather significant positive correlation between socio-economic status and mental ability. A research study (reported in 1924) showed that the median I.Q. is 116, while the median for children of the common laboring class is 89. This ability grouping relegates a large percent of children of low economic status to slow-learning groups and those of high socio-economic status to the top groups.³²

A. B. Hollingshead in *Elmtown's Youth* says that:

it is believed . . . that the grades a student receives are

³¹Robert J. Havighurst and Bernice L. Weugarten, *Society and Education*, p. 234-237.

³²Maurice Ahrens and Jean Fair, "Grouping in Senior High School", *National Education Association Journal*, XLVIII (September 1959), 25.

determined by the position of his parents in the social structure rather than by his ability or his industriousness.³³

A perusal of the literature on the issue of ability grouping leads the writer to form the conclusion that there is not enough evidence to validate the superiority of ability grouping. Many of the studies supporting ability grouping were made in the 20's and 30's; even those made from the early surge of interest in ability grouping up to the present appear to be too limited and too restricted in scope because of the small sample size and the short duration of the study, and because inadequate attention has been given to the effect of special classes for the gifted on the behavior of the rest of the students. Few studies have been concerned with the adjustment of pupils involved with social, personal, and emotional results—these studies show that ability grouping has a detrimental effect on the pupils involved. Ability grouping has an influence on self-perception and attitude toward others. More research is needed in this area. A few studies show that ability grouping causes a class system to exist in the minds of the children themselves; this questions the purpose of the American education system—are schools that segregate the students identifying and accentuating an elect based on ability rather than on demonstrated products or results?

Evidence is fairly conclusive that ability grouping does not produce improved achievement in children; evidence does show however that it is detrimental to children of average and lower ability because of the deprivation of intellectual stimulation. No evidence shows that the bright students suffer when left with those of lesser ability. Thus heterogeneous grouping seems to be the answer to the American dilemma of separating students for instruction.

³³A. B. Hollingshead, *Elmtown's Youth*, p. 181.

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In Our Other America

by

Raymond Pace Alexander

It is a pleasure to return once more to the great State of Georgia, this time to its oldest city, Savannah, and incidentally to one of the busiest and most successful seaports in our nation. You will not be surprised that I mention this fact when I tell you that, as Chairman of the City of Philadelphia's Committee of Commerce and Port Development during my eight years in the City Council of Philadelphia, I made for our city a careful study of the Atlantic seaports from Boston to New Orleans to see how we could improve not only the facilities of the Philadelphia Port on our Delaware River but how we could encourage more ocean going vessels to land their cargoes in our city and thus substantially increase cargo tonnage in our port. I must say, to your credit, we had more trouble and tougher competition with the Port of Savannah than any other seaport on the Atlantic Coast. You battled us every inch of the way. You fought hard for every ship and every ton of cargo—so hard, I really don't know who won. My hat is off to you and to your city administration. I understand you are still increasing your tonnage.

I want to express my deep appreciation to your esteemed and distinguished President, my longtime and warm friend, Dr. Howard Jordan, Jr., the sixth president of this great college for his generous invitation to have me appear before this interesting audience of brilliant ladies and gentlemen of the faculty representing the professors, associate and assistant professors, who are no doubt just as happy to see you on your way—as you are to “be on the way,” and to deliver the Commencement Address today. This year, 1965, incidentally, I gathered from your history is the 75th anniversary of your founding. It was in November of 1890 that the General Assembly of this state established this institution; and it is interesting to note, it was and still is, “a part of the University System of Georgia.” I shall have something to say about this later in my address.

It becomes difficult for one as I, a Negro, who has been invited to deliver the commencement address at one of the great Negro colleges of America, the Savannah State College, a division of the University System of Georgia, in a great Southern State, Georgia, not to speak of the struggle of the Negro known and reported throughout the world for full social, economic and political freedom. Indeed, if I, a very active practicing lawyer in my youth and for thirty-two years before my appointment to the Court of Common Pleas in Philadelphia, as I was, an early leader in the fight for civil rights, did not refer to this movement, you, I am certain, would leave this auditorium in utter bewilderment.

The intense concern over race in America which is known to all of us here and which we read about constantly and the current social

revolution throughout America forcibly points up the fact that, for the Negro population of our country there is *another* America quite totally apart from that known to the average *white* American. That is *our* America.

Michael Harrington in his excellent socio-economic study of poverty in the United States, the title to which is "The Other America," wrote forcefully of the desperation, the bewilderment and the alienation of the tens of millions of impoverished Americans. He estimated the number to be over 40,000,000 Americans who live within sight of the now famous "affluent society" but who have no hope of achieving it or its benefits.

He said, ". . . tens of millions Americans are, at this very moment maimed in body and spirit, existing at levels beneath those necessary for human decency . . . they are hungry . . . they are without adequate housing and education and medical care . . ." Harrington was referring to ". . . mostly white . . . unskilled workers, the migrant laborers, the aged, the minorities, the underprivileged living within this affluent society." He said, "their housing, their education and their medical care are skimped and inadequate." To this list I would add the displaced workers, the miners of Appalachia, the dust bowl and marginal farmers and farm workers displaced by machines and the industrial rejects.

If this is true to the extent reported—and carefully gathered statistics support these remarks—then it is clear that poverty is *not* a Negro phenomenon. You will ask, I am certain, how much more true then do these words apply to the Negro population of America?

The latest available figures estimate the total population of America to be in excess of 190,000,000 people. The Negro population is slightly less than 20,000,000. How many of this vast Negro population can be called "impoverished Americans" living in the center of "an affluent society?"

Much more important, however, to a graduating class of 200 young Negro men and women, truly the flower of our race, upon whom with the thousands of other Negroes similarly situated, graduating from colleges, universities and professional schools all over America, the future not only of the *Negro* but of America itself depends, you want to know what are the common denominators of the "impoverished Negro" and what *must* be done to wipe out this disease. You will ask, "How long, how long O'Lord will there be *"two Americas?"*

Confining my remarks to the Negro as a whole and the problems that confront him as a minority race within a larger majority, the Negro appears as a small undeveloped nation within a large highly developed nation. This, I suggest is a completely accurate statement, but must not be taken out of context. It must be viewed in the proper perspective. For example there are, as we well know, many many millions of well educated, very successful, well established Negro men and women in all the professions and in scores of businesses who are recognized throughout America as successful by any stand-

ards and who are financially independent. But, in further analysis of the roots of the problem that underscore the Negro unrest and the current revolution, the social psychologists must conclude that the many millions of Negroes supporting the revolution led by Dr. Martin Luther King, the NAACP, Urban League, CORE, SNCC and scores of smaller groups have one thing in common—*poverty*. Poverty to the Negro embraces much more and is more complex than the poverty faced by the white man. The Negro family is unique. The Negro is the *only American* that the culture for a hundred years *has deliberately, by law and custom* made a second class citizen, made weak and without hope. The Negro masses have faced a history of the germs that breed poverty for generations, viz: alienation and complete isolation from the culture of the affluent society, indeed a total rejection that results in a spiritual emptiness which tends to destroy all sense of racial purpose, lack of genuine respect resulting in anguish, fear and finally being totally ignored by most conventional social agencies, resulting in resentment, hostility and apathy. You will note and wonder that I have not included in this breakdown of the underlying causes of poverty among the Negro masses *throughout America*—in the North, East, West—as well as, and more importantly in the South the denial to the Negro the *same* opportunities of quality education, integrated from pre-school, through kindergarten, grammar, high school and college, *throughout America*, as that given to white children. If the denial of equal non-discriminatory education were our only complaint, and, on the contrary, if we were given equal opportunity for employment in the same jobs and on the same basis as white workers, if we were faced with no discrimination in other areas of our life, the Negro would *not* be twelve per cent of the nation's unemployed while the total unemployed is at a 4.7% level; nor would the incident of Negro crime, proportionally, be approximately three times that of white persons charged with crime; nor would available statistics for welfare or relief payments to Negro families be so out of proportion to the payment to white families on relief. I cannot leave this subject without emphasizing the fact that the Negro poor (as described above) and their low income families produce the millions of children who traditionally, by law in the South, and de facto neighborhood segregation in the North, go to most inferior schools, who are exposed to most inferior quality education, whose families have, for the most part, a low opinion of the value of education and who encourage the earliest possible “legal” dropping out of school.

The picture that I am endeavoring to draw to the attention of the 1965 graduating class of this great Negro college in Georgia, to their parents, to the distinguished president and faculty, to the college community of Savannah and to America is that to the white man poverty usually results from the loss of or the inability to get a job to earn enough money to provide for him and his family or from illness and old age. To the Negro his poverty is far worse. It is far more complex, and a job alone cannot cure it. His poverty is far more deadly. Perhaps the most damaging feature of poverty as it affects the Negro masses is that millions of children of those now

in poverty begin life in a situation of *inherited poverty* and, because of many conditions very obvious to persons of average intelligence, these children as they grow up find it more and more difficult to break into the more affluent society.

With this, what I hope to have you believe, clearer understanding of the difference between poverty as it is commonly understood and the more complex nature of poverty as it affects and stigmatizes the Negro, one can quickly justify all movements by Negroes of a non-violent nature to free themselves of this condition and the crippling and deadly destructive germs which feed its roots. You will no doubt realize by now that perhaps many more millions of Negroes, percentage wise, than whites may be classed as "impoverished Americans." In this you are quite correct, I regret to say. Authorities differ on this subject, which is understandable. (As a judge of the highest trial court in Pennsylvania, experts in many scientific fields appear before me in the trial of cases, civil and criminal. I am never surprised to find some of America's most renowned doctors, specialists in various fields of science, engineering, etc. who expound, in the most detailed and scientific manner—completely *opposing* views to sustain their opinion of a certain disputed scientific happening of a specific event.) I have examined records from the United States Department of Commerce, the statisticians of the AFL-CIO as well as those made by Michael Harrington and Robert Lampman and I note they all differ widely. Harrington says there are 40,000,000 American poor. Lampman says there are 32,000,000 and of these he estimates 6,400,000 are Negroes or 20% of the total. Harrington thinks the non-white poor in his 40,000,000 figure is 8,000,000. Each one reaches the same conclusion that the "*Negro poor*" under their limited definition of "poor" is 20% of the total or two times the Negro percentage (10 plus — per cent) of the total population. In my analysis of the "impoverished Negro" described above, I estimate that the number of impoverished Negroes, heads of families and their children at the current growing birth rate, faced with all of the built in denials, rejections and inherited hardships, rises to a figure close to *nine million Negroes* in OUR OTHER AMERICA.

Nothing less than a *Marshall Plan* for the Negroes of America, federally administered and controlled, operating under a new federal bureau, a specifically created section of the Health, Education and Welfare Department, completely free of local and state political interference, can properly do the job.

A great President, Lyndon B. Johnson, said in a speech to the Joint Session of Congress on March 15th this year, a speech that will live and be revered long in history, that "The time for waiting is gone . . . The time for justice has come . . ."

This was the speech in which the President and Congress declared total war against those who have for so long violated the rights and thwarted the dreams of American Negroes.

This was the speech made after the crimes of Selma—the murder of Jimmie Lee Jackson, the cruel killing of the Reverend James Reeb

and the cold blooded "hooded raiders" KKK killing of a defenseless Detroit housewife, Mrs. Viola Liuzzo.

I address this challenge to the State of Georgia as a vitally important step in the era of an unfolding moral process in which all of us are involved.

The recently enacted Anti-Poverty Program cannot do the job needed to reach the hardcore victims of a life time of unceasing poverty of the cruelest sort that they, the present young people of today, their parents and grandparents have suffered ever since their ancestors were freed from the shackles of slavery. As exemplary and necessary as the anti-poverty program is, the haste with which it was conceived, the interplay of political forces at the local and state level, the bureaucratic inertia surrounding its beginning and the admitted lack of exact planning and skilled personnel, do not augur well for its success in meeting its objectives. This is certainly true as far as the nine million impoverished Negroes are concerned.

Project Head-Start, limited as it is in its scope of operations and well defined as to purpose, offering education at the pre-school age level to some 150,000 children from disadvantaged homes and neighborhoods, in an eight week summer program, is far and away a more workable plan to reach deprived children than the anti-poverty program in its endeavor to reach the staggering number of America's poor.

American Negroes deserve this special and preferential treatment. It is a debt long overdue and too long postponed. The overwhelming majority of Negroes are descendants of people who for centuries labored from sun-up to sun-down, year in and year out without any pay, with no holidays or vacation time—only food and the barest of clothing and living quarters. Untold thousands suffered unspeakable cruelties, hardship and death while their master's families and children lived on the rich products of the soil on luxuries and in leisure and obtained the best education in the arts, sciences and professions that America and Europe could afford. For a hundred years since freedom from slavery the laws of the South required complete separation of the races in every facility for the educational and social advancement of the Negro. He was totally rejected by the white South and was soon caught up in a cycle of poverty from which he and his descendants were never able to extricate themselves. The overwhelming majority of Negroes were trapped in an array of inferior schools with inferior teaching and facilities which their descendants, today's children, have inherited. Those who fled the South to the overcrowded metropolii of the North have carried these entrapments with them, thus creating new and even greater problems in the industrial areas to which they were *totally unprepared and strangers to its way of life*. For this they were not at all responsible. The responsibility was that of the states from which they came and as well the states of the North which knew of these conditions for years but preferred to remain silent as if they did not exist. As a result we have the teeming, depressed slums of culturally and socially deprived Negroes forming ghettos in the once thriving metropolitan cities of the North. In my city alone, Philadelphia, our Negro popu-

lation is 560,000; in New York it is 1,110,000; in Chicago it is 810,000 and growing in each city. These three cities have the largest Negro metropolitan population in America.

Today millions of able bodied, willing and devoted Negro men and women are now trapped by the fantastic technological machines of automation as industrial rejects, unfits, non-educable masses of heretofore highly regarded, well-muscled, happy and cooperative manpower in the days of full utilization of hand labor.

What becomes of the "American Dream" to these people? An empty . . . worse . . . a dangerous illusion.

General George Marshall of World War II fame, then Secretary of Defense in the Cabinet of President Truman, on delivering a commencement address at Harvard at the conclusion of the War that devastated most of Central Europe, vast parts of Russia and Italy, as well as inflicting colossal damage on France and England made the much applauded address, acclaimed throughout the world, that launched the famous Marshall Plan to aid our allies of World War II. As we all know this was the plan that gave outright gifts of billions of American dollars and goods to our former most bitter and death-dealing enemies as well as our allies. These gifts of billions enabled *all* of the combatants, *allies* and *enemy alike* to maintain their free democratic government (except Russia which, however, *did* retain her form of government) to rebuild their economy to a point higher than they ever held before in peace time and restore those countries to a place equal to America in the councils of the free nations of the world. This is the way we in America have traditionally treated victor and vanquished alike. For this unprecedented charity we are rewarded by scores of our embassies being broken into, windows smashed, paint and garbage strewn about and against our walls. Their favorite song is not one to "bless America" or say "thank you America," but "Yankee go home." Those countries that do not go to that extreme, France for example, have turned a cold shoulder to us in our proffer of friendly communication and cooperation and refuse even to participate in international discussions in our effort to resolve present international unrest in the Caribbean, in South America and in Asia.

The Negro—three and one half millions of them—was caught between the two warring factions in the Civil War, the bloodiest war of all times prior to that conflict; 225,000 Negroes served in the army and navy of the North while millions were protecting the homes and families of their masters and thousands served the armies of the South as laborers. Upon emancipation he was set free. He had nothing: no home, no money, no property, not even a horse or a mule to help him on his way. In fact, he had no where to go. He gained freedom, but in a land where the benefits of freedom were and have been effectively denied him for more than one hundred years. He became in all respects an "orphan" a victim of the War. He is the only victim of a war in which America was involved for whom *no help, no aid* program was ever organized to relieve his suffering.

I speak these words in the State of Georgia, a state which is rapidly rising to become soon the most forward looking and advanced state

in the traditional "solid South" in regard to the right of the Negro to participate in politics and government and to be elected to the highest offices of your state government. There are two Negro Senators as well as members of the lower house with the excellent prospect of this number rising to seven in the fall elections. You have voluntarily opened the doors of many of your institutions of higher learning to Negro students, and you are making valiant efforts to integrate your public schools in keeping with the Supreme Court's decision of 1954. For too long the South has ignored its most valuable natural resource—the Negro in our midst—and assigned him to the forgotten wastelands. You have lost the finest products of your land, your trusted and devoted Negro manpower and women workers, whose children, had they been provided with equal opportunities for high quality education and the gaining of technical and scientific skills would have provided you with the technical, electronic and technological skills so sorely needed today in the South. Many thousands of your skilled and successful Negroes born on the soil of Georgia and the South flee the Southern states and, because of conditions, go to the North and West and furnish their skills to competing Northern industries. Many more thousands of young Negroes, as you well know, who were sent North on scholarships to Northern colleges from the Southern states because of the refusal of your schools to accept them, paid for by your taxpayers, went North, finished college, never to return to the South. These happenings, as you know have reached alarming proportions in all of the Southern states and have been the subject of many secret inquiries.

The State of Georgia should be the first state to support the call for a federally operated Marshall Plan for Negroes. You have an outstandingly liberal Mayor of the City of Atlanta, Mayor Ivan Allen, Jr. You have one of the nation's greatest newspapers *The Atlanta Constitution*, whose publisher, editor and columnists are known and respected throughout America for their liberal racial philosophy. I refer to Mr. Ralph J. McGill and Mr. Eugene Patterson. You have in this state some of the most respected colleges and universities in America. You have great lawyers and highly respected courts in this state. I make this statement as a member of a great Pennsylvania judiciary and I cannot say this without feeling deep down in my heart that your great bar should of its own accord and on its own motion, for the honor of the name of the great and old American state, assist as an *amicus curiae*, the United States Department of Justice in its effort to bring to justice the perpetrators of that cruel cold blooded killing at night on the Georgia highway near Athens, last July 1964, of that brilliant Negro educator, Army Reserve Officer, Lt. Col. Lemuel A. Penn, by the hooded Klansmen who have for too long brought shame, disgrace and calumny on the name of the State of Georgia.

What is there to deter the State of Georgia from petitioning one of the greatest and most successful presidents of the United States ever elected to this high office, President Lyndon B. Johnson, to ask Congress to empower the proper committee to study ways and means to enact into law a bill to create a "Marshall Plan" designed specifi-

cally to right the wrongs, too long ignored, to America's impoverished Negroes, numbering nearly nine million. A few of the billions of dollars given annually to foreign countries which, as I have indicated, have little or no love or regard for America, but on the contrary hatred and envy, could be diverted to remove our native Negro Americans from the wastelands of poverty and from the total alienation from society. This money would restore hope for a future so that the Negro would see the American dream as a reality rather than a cruel illusion.

The South has had a moral obligation to do this for a long number of years. The present condition of the Negro throughout America makes it a federal obligation. A test of your sincerity must be your feeling of conscience on this subject. There is no obligation of conscience higher than your duty to the unquestioned humanity of this appeal. The billions of dollars spent for this program will be a magnificent investment in the development of millions of new lives, of new people, with renewed hope in the authority of morality and humanity in the affairs of government. The wages earned by these people, their purchasing power, their payment of taxes to our government will far exceed the expense of this program.

You will create millions of new *taxpayers* from your present rolls of *tax-eaters*.

The failures of history should be faced courageously, and *now*, while the protest of your fellow man is still in progress. By so doing you would effectively rebuke the furtive legions of masked men who despoil the name of a great state by their unspeakable acts of inhumanity.

I dream a world where man
No other man will scorn,
Where love will bless the earth
And peace its paths adorn.
I dream a world where all
Will know sweet freedom's way
Where greed no longer saps the soul
Nor avarice blights our day.
A world I dream where black or white,
Whatever race you be,
Will share the bounties of the earth
And every man is free,
Where wretchedness will hang its head,
And joy, like a pearl,
Attends the needs of all mankind.
Of such I dream—
Our world!¹

—Commencement Address
Savannah State College
June 6, 1965 by
Raymond Pace Alexander
Judge, Common Pleas Court
Philadelphia, Pennsylvania

¹"I Dream A World," Martel's aria from *Troubled Island*.

Isolation of Lignoceric Acid from Acorns

by

Charles Pratt

Introduction

Lignoceric acid belongs to a group of organic compounds popularly known as "fatty acids." The name fatty acid is due to the occurrence of higher homologs such as palmitic, the C_{16} member, and stearic, the C_{18} member, acids in natural fats in the form of glycerides (1). It is generally the acids with an even number of carbon atoms which are found in normal fats. The fats with very small numbers of carbon atoms or with unsaturated chains tend to be liquid and are called oils while those with larger numbers of carbons and saturated chains are solids.

Lignoceric acid has twenty-four carbon atoms and like all acids in this group with 10 carbons or more, is a solid. Its formula is: $CH_3(CH_2)_{22}COOH$. It is not as widely distributed in nature as palmitic acid, stearic acid, and oleic acid. Detection of its presence in acorns was somewhat a surprise inasmuch as no published accounts of its occurrence in acorns seem to exist.

Experimental

One kg of acorns from the common pine oak trees were crushed with a Waring Blendor and the mean was extracted with ether in a soxhlet extractor. When the liquid coming over was no longer colored, the extraction was assumed to be completed. The solvent (ether) was removed by evaporation under the hood, and the saponification number of the oil was determined. To 1.50 g of oil was added 25 ml of alcoholic KOH, .2501N, and the solution was refluxed for one hour. The solution was allowed to cool and the excess KOH was titrated with a .200N hydrochloric acid.

Saponification Number:

$$\begin{array}{rcl} \text{ml of KOH} & = & 20 \\ \text{Normality of KOH} & = & 0.2501 \\ \text{m.e. of KOH} & = & 5.0020 \\ \text{ml of acid} & = & 5 \\ \text{Normality of acid} & = & .2000 \\ \text{m.e. of acid} & = & 1.0 \end{array}$$

*The investigator is indebted to John Lang, a chemistry student at Savannah State College, for his cooperation and assistance.

$$\text{m.e. of KOH neutralized by oil} = \frac{\text{m.e. base}}{5.002-1.000} = \frac{\text{—m.e. HCl}}{4.002}$$

$$\begin{aligned}\text{grams of KOH hydrolyzing the oil} &= 0.224 \\ \text{Wt. of oil} &= 1.5 \text{ g}\end{aligned}$$

$$\begin{aligned}\text{S. N.} &= \frac{\frac{.224\text{g KOH}}{1.5\text{g oil}} \times \frac{\text{Xg KOH}}{1\text{g oil}}}{\text{X}} \\ \text{X} &= .49 \text{ g or } 149 \text{ mg KOH} \\ \text{S.N.} &= 149\end{aligned}$$

Once the saponification number was determined, it was used as a guide to hydrolysis.

One hundred grams of acorn oil were mixed with 500 ml of water and 16 g (a slight excess) of solid KOH was added to this mixture. After refluxing, for one hour, the flask was cooled and its contents neutralized with 6N hydrochloric acid. Upon cooling, a solid separated and formed a top layer which was removed and its water pressed from it with filter paper. The fatty acid mixture was placed on the Fisher Zone Refiner and the zone which appeared in largest quantity, about 80 per cent, was removed and further analyzed.

Analysis

<i>Calculated</i>	<i>Found</i>
Carbon = 78.26	78.01
Hydrogen = 13.04	12.99
M.p. 81-82°C(2)	82.1°C

Summary

The oil of acorns was extracted and its Saponification number was determined. This information was used as a guide in the hydrolysis of larger quantities of oil.

More than one fatty acid was found to be in the acorn oil, but one acid composed about 80 per cent of the fatty acid mixture. It was purified by use of the Fisher Zone Refiner, and its element composition and melting point indicate that it is lignoceric acid.

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2. Lange, N. A., "Handbook of Chemistry", Handbook Publishers, Sandusky, Ohio, 8th Ed., p. 574, 1952.

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Why Climb Mount Parnassus?*

by

Miles M. Jackson, Jr.

National Library Week with the theme, "Wake Up and Read," was launched in 1958 as the first attempt to create interest and call attention to the nation's libraries, to stimulate the establishment and building of home libraries and to promote the many values of reading for people of all ages in every walk of life. This week of celebrating the value of libraries is not an end in itself, but rather a concerted effort to focus on the year round activities of reading and making use of libraries.

This morning, I am not going to give you a sermon and I assure you not a lecture on why you should use libraries, because I know Mr. Josey and his staff have urged you to take advantage of your library here at Savannah State College. Instead, I want to talk with you about three men—James Baldwin, Ralph Ellison and Richard Wright. These three men have several things in common. First, they are Americans; second, they are Negroes; and third, somewhere in their writings they have revealed that librarians and libraries have played an important role in their lives as creative writers. Two of these men are contemporaries of yours and thus have witnessed all of the historic events that have taken place in your life time and mine. As creative writers they have chosen to climb Mount Parnassus to view and interpret the world as they see it. A word about Parnassus. Parnassus is a mountain in the central part of Greece. It was at one time regarded as sacred to Apollo and the Muses and as the domain of literature. I am using Parnassus figuratively here because as we will see later these three men were born in environments that you and I know so well. But more important than this is the fact that something happened to them as young men that caused them to choose creative writing as a means by which they could best make their contribution to their fellow man.

Let us take a look briefly at these three men—their places of birth, environment as young men and some of the events that perhaps led to their becoming writers. James Baldwin was born in Harlem in 1924. He is the eldest of nine children whose father was a Penecostal preacher. The Harlem that James Baldwin knows so well was his home for seventeen years. Baldwin describes his father as "a proud, bitter, and rigid man whom his children were never glad to see come home." In this same essay he comments further, "we had not known that he was being eaten up by paranoia, and the discovery that his cruelty, to our bodies and our minds had been one of the symptoms of his illness was not, then, enough to enable us to forgive

*Delivered at the National Library Week Convention, Savannah State College, April 30, 1965.

him." It was almost twenty years later that James was able to give this explanation of his experiences with his father, "Part of his problem was he couldn't feed his kids, but I was a kid and I didn't know that."

It was as a youngster that Baldwin discovered the library—a Harlem branch of the New York Public Library. He attended the children's story hour and as a teenager he read and re-read *Uncle Tom's Cabin* and *The Tale of Two Cities* and held as his favorite authors Henry James, Ernest Hemingway, John Steinbeck, Hawthorne and many others. By the time Baldwin was fourteen, he was a preacher at the Fireside Pentecostal Church in Harlem and as one literary critic said "he preached the word, reveling in a most unholy fashion over his superiority to his father as a ministerial drawing card." Some of his teachers at DeWitt Clinton High School remember him as a "small, bright, sad-looking boy." He was editor of the High School literary magazine and spent much of his free time writing, instead of stick ball on the streets of Harlem. After three "hysterical-tinged years" as a preacher, he discovered that he would rather be a writer than a boy preacher. He realized that living at home with his family did not permit him the solitude and time for the creative process, and so for the next five years Baldwin lived in Greenwich Village earning his living as a handy man, office boy, factory worker, dishwasher and waiter. Intent on mastering the craft, he spent his evenings writing. His big break came in 1945 when he was awarded a Eugene Saxton Fellowship, which permitted him to devote himself full time to his interest in literary work. Following his first professional publication, which was a book review in *Nation* magazine, it was not long before articles and stories appeared in *Partisan Review*, *American Mercury*, *Commentary*, *Reporter* and *Harper's Magazine*.

Like many of the earlier American writers, who as young men became disenchanted with America and became exiled, Baldwin moved to Paris in 1948. It was while in Paris he was able to develop in a more congenial atmosphere. He stated that he wanted to go to Paris so that he would not become "merely a Negro writer." Europe soon allowed him to view America objectively. Being far enough away, he discovered that this had many advantages. But after a few years he found that Paris was not completely the haven he had expected—*he found no green pasture*. At least he was able to publish his first book, a novel with a significant enough title, *Go Tell It On The Mountain*. This first novel was a realistic and poetic story of the religious life of a fourteen year old boy in Harlem. This first book was plainly an autobiographical novel. Who else was more qualified than James Baldwin to write on such a subject? In 1955, *Notes of a Native Son* was published and brought together ten essays that revealed his feelings on a number of subjects. Following this second book there followed several novels and essays. And as you know, *The Fire Next Time* was a best seller in 1963 and is considered an explosive summing up of his views on the racial problem in the United States. I might add that Baldwin's first play *The Amen Corner* was produced at Howard University in 1954 and again last

year in Beverly Hills, California. A very recent play *Blues for Mr. Charlie* opened on Broadway and is now appearing in Europe. Librarians like to think about Baldwin's introduction to the Harlem Branch of the NYPL was the beginning of his becoming a writer.

In Ralph Ellison's recent book *Shadow and Act* published in 1964, his dedication reads, "For Morteza Sprague, a dedicated Dreamer in a land most strange." An author dedicates his book to an individual or individuals who have been an inspiration to him or contributed in some great way to the writing of his book. It is significant, I feel, to note that Morteza Sprague, the dreamer, is a librarian at Tuskegee Institute and has been for thirty years or more. Ralph Ellison attended Tuskegee Institute and as a freshman took an introductory course in literature from Mr. Sprague. Ellison's main interest was music then. He had played trumpet in the Oklahoma City High School band and was studying harmony and form at Tuskegee. In the Spring of 1962, I had the good fortune to meet Ralph Ellison, and he told me that during this time he also had a great interest in sculpture and contemplated, at one time, while at Tuskegee, changing his major to sculpture. This was before he even dreamed of earning his living by writing. In fact, Ellison's father had hopes of Ralph's becoming a poet. His father did not reveal this until many years after Ellison dropped out of Tuskegee.

Now Ellison is an older man than Baldwin and five years younger than the late Richard Wright. Ellison came up a different path. He was born in Oklahoma, attended Tuskegee for three years and out of this early experience his life was shaped so as to make him into a different kind of writer. Ellison lost his father in a different way than Baldwin—rather than losing his father to death it was to desertion. His father had been a construction foreman, served in the Army in the Philippines and the Orient, had read widely and because of his love of literature had named his son Ralph Waldo Emerson Ellison. His mother was strong minded and had definite convictions. Although she worked as a servant for white families in Oklahoma City, she also campaigned among Negro voters for Eugene Debs' Socialist Party. Ellison recalled that his mother bought him a phonograph player and records, electrical sets and a toy typewriter and told him that "the world would not always be in the condition it is if he fought hard to change it." At an early age his mother had encouraged him to read, and he discovered while in high school, T. S. Eliot's *Wasteland* and because of his interest in poetry he attempted to "follow up all the footnotes, reading all those books." Perhaps, it was in the library at Tuskegee when he discovered Countee Cullen's poem "Heritage." A poem that was to make a profound change in his attitude towards the Negro.

Ellison left Tuskegee at the completion of his third year because of a misunderstanding regarding his scholarship. He went to New York for work and study in music and sculpturing and never returned to college. In New York he met Richard Wright who felt he had talent in writing and encouraged him. Ralph wrote short stories, articles on jazz and on other aspects of America cultural contribu-

tions. In 1952, his first novel *Invisible Man* won the National Book Award and wide acclaim as an American novel. The writing of this work established Ellison in the ranks of the great American novelists.

It should be noted that Ellison's orientation as a young man is very much revealed when one takes a look at his attitude towards himself as an American Negro. He believes there is a distinctive Negro culture and that the Negro identity of the future will be shaped and molded out of the unique Negro folk tradition. In answer to the question, "What am I?" Ellison remarked, "I answer that I am a Negro American. That means far more than something racial. It does not mean race, it means something cultural, that I am a man who shares a dual heritage. For me, the Negro is a member of an American-bound cultural group with its own idiom, its own psychology, growing out of its preoccupations with certain problems for hundreds of years, out of all its history. The American Negro stock is here, a synthesis of various African cultures, then of slavery, and all of the experiences of Negroes since." We might agree or disagree with what Ellison says. But there are certain facts of Ellison's life and writing. When he says of America, "I think it is a wonderful country." We know he means it. As a writer he sees our problems as human, not racial and tries hard not to get into the field of sociology in his writings. In his introduction to *Shadow and Act* he states his feeling about reading. "The pleasure which I derived from reading had long been a necessity. And in the act of reading, that marvelous collaboration between the writer's artful vision and the sense of the reader's sense of life, I had become acquainted with other possible selves—freer, more courageous and ingenuous and even wise."

In 1909 on a plantation near Natchez, Mississippi, Richard Wright was born of a peasant father and a mother who was a devout christian. She was forced to support her young family because of circumstances beyond her control. By fifteen, Richard Wright had lived in Natchez, Jackson, Greenwood and Carters in Mississippi; Elaine, Helena, and West Helena in Arkansas; and Memphis. As we can see, his childhood consisted of moving from one Southern town to the next, or part-time jobs and sporadic schooling. At fifteen, he ran away from home and took a job in Memphis. It was in Memphis where he had his first public library experience. In his essay "*The Ethics of Jim Crow*," published in 1937, he describes how he devised a way to borrow books from the public library. ". . . It was almost impossible to get a book to read. It was assumed that after a Negro had imbibed what scanty schooling the state furnished he had no further need for books. I was always borrowing books from men on the job. One day I mustered enough courage to ask one of the men to let me get books from the library in his name. Surprisingly, he consented Armed with a library card, I obtained books in the following manner. I would write a note addressed to the librarian and sign the name of my white supervisor. I would stand at the desk, hat in hand, looking as unbookish as possible. When I received the books I would take them home. If the books listed in the note happened to be out, I would sneak into the lobby and forge a new one."

In Memphis, Wright developed a passion for reading, cutting his teeth on authors such as Theodore Dreiser, H. L. Mencken, Sinclair Lewis, and Sherwood Anderson. His first published pieces were poems, articles and stories. The Federal Writers Project hired him and published one of his stories in the anthology, *American Stuff*. His first book *Uncle Tom's Children* (1936) was followed by *Native Son*, *Twelve Million Black Voices*, *Black Boy*, *The Outsider*, and several other works of lesser stature.

In the course of Richard Wright's life, he rejected America three times: once as a Negro Nationalist, once as a young political revolutionary and finally as an expatriate. He searched for an honorable adjustment in this country, but ended up moving his family to Paris where he died about four years ago. Unlike James Baldwin, Richard Wright, alienated and disallusioned, died away from his homeland. Yes, something did happen to Richard Wright as a young man.

Very briefly we have looked at the lives of three American writers. Three men who have climbed Mount Parnassus. Now the question—"Why Climb Mount Parnassus?" We could reply, "because the view is better from there," or "a writer needs to be in the clouds in order to have the objectivity to see those things in life we all see much clearer and with depth," or "to associate with the muses on some sort of esoteric level." You can see we could go on and on about reasons for climbing Mount Parnassus. But I would like to invite you to ask yourselves this question now. Perhaps you will not have an answer immediately. I assure you—there are pat answers that can be given to you in class or in a convocation such as this. But I think the real answer will come through personal discovery.

I would like to emphasize the fact that my brief remarks this morning are not intended as a critique of American literature, but rather an attempt to call your attention to three men who through personal discovery found libraries and books, in a very practical way, to be a source of inspiration that I would like to pass on to you. Being content to use only textbooks or to go on day after day blindly—past the campus library is not the way to make this discovery—it is not the way to begin the climb of Mount Parnassus.

An Appraisal of a Pre-Freshman Summer Program

by

Robert D. Reid

Within the past few years pre-college programs for educationally deprived young people have been undertaken by a few institutions of higher learning, including approximately twenty predominantly Negro colleges and universities. Most of these projects have been carried on during the summer months for periods ranging from six to nine weeks, although some of them have been conducted on weekends, following the close of the school day, or during evening hours. Adult education programs have been made available by some institutions in order to provide vocational and non-vocational opportunities for persons whose educational training has been interrupted or curtailed.

Many of the summer programs have been designed for prospective Negro college students who seems to have the potential to succeed in college but whose academic records and/or scores on standardized tests indicate the need for remediation. While a few of the institutions have designed programs for students who have completed the ninth, tenth, and eleventh grades, most of them have enrolled selected groups of students who have graduated from high school. Because of the support received by the colleges and universities from several leading foundations, students have attended these pre-summer institutes without charge or after paying a very nominal fee.

Even though the greatest impact would be achieved in bridging the gap among disadvantaged young people if compensatory programs were launched on the elementary and secondary levels and most desirably before these young people begin their formal education, it is likely that the predominantly Negro colleges will assume some of this responsibility for a long time. As McGrath has well said, "... the opportunity for a college education cannot be postponed for twelve years while children receive adequate elementary and secondary education. For many the nation's predominantly Negro colleges must bridge the gap. Rather than limiting their admissions and their programs, these colleges must be prepared to use a variety of special educational devices . . . to repair the academic deficiencies of high school graduates and prepare them to proceed apace with their higher education."¹

The writer was privileged to direct an eight-week pre-college program at Tuskegee Institute between July 15 and August 7, 1964, in which one hundred and sixty young people were enrolled. The project

¹Earl J. McGrath, *The Predominantly Negro Colleges and Universities in Transition*. (New York: Bureau of Publications, Teacher's College, Columbia University), pp. 50-51.

was partly financed by the Doris Duke and Ford Foundations. Most of the student participants had indicated Tuskegee Institute as their first or second choice college when they were administered the Cooperative Intercollegiate Examination Program. These students ranked below the fiftieth percentile and above the fifteenth percentile in at least two of the three areas tested (English usage, reading comprehension, and mathematical computation). Of the eighty-seven females and seventy-three males who enrolled in the program, one hundred and four were in this category; twenty-six students had graduated from high school, but ranked above the fiftieth percentile in the three subject matter areas. Thirty students who had completed the eleventh grade were permitted to enroll in order to determine whether there would be significant differences between the rates of progress made by the two groups of students. Without exception the eleventh graders had superior academic records and ranked at or above the fiftieth percentile in the three areas tested on the Cooperative Intercollegiate Examination Program.

A charge of fifty dollars was made to participants for room, board, laundry, incidental fees and instructional materials. One hundred and forty-nine of the students were residents of seven southeastern states: (Alabama (92), Florida (10), Georgia (30), Louisiana (4), Mississippi (2), South Carolina (9), and Tennessee (2)). The remaining students came from seven other states (9), the District of Columbia (1), and the Virgin Islands (1). Three students dropped out before the project was concluded because of illness.

The group was pre-tested on June 15 between 8:30 and 10:00 a.m., and from 1:30 until 4:30 p.m., and again on the morning of June 16 between 10:00 and 11:30 a.m. The following tests were administered: (1) Henmon-Nelson Test of Mental Maturity; (2) Nelson-Denny Reading Test (Form A); (3) Iowa Silent Reading Advanced Test (Form CM); (4) California Test of English Usage (Form A); and (5) California Advanced Mathematics Test (Form W).

Most of the students ranked below the fiftieth percentile or tested below their grade level on the pre-test. One student who dropped out of the program during the first week was absent when the tests were administered. On the Henmon-Nelson Test of Mental Maturity, the I.Q.'s of 112 students (70.4%) ranked between 85 and 114; the I.Q.'s of 45 students (28.3%) were below 85, while the I.Q.'s of two students were about 114.²

On the Nelson-Denny Reading Test, 122 (76.7%) of the 159 students ranked below their appropriate grade levels; 115 (72.8%) of 158 tested below their grade levels on the Iowa Silent Reading

²There is reason to question the test results on the Henmon-Nelson Test. One student, for example, whose I.Q. was indicated as 79, had a grade placement of 13.8 on the Nelson-Denny Reading Test, a grade placement of 13+ on the Iowa Silent Reading Test, and a grade placement of 14.8 on the California Advanced Mathematics Test. This student ranked at the eightieth percentile on the California Test of English Usage.

and California Advanced Mathematics Tests; 104 (65.4%) of 159 ranked below the fiftieth percentile on the California Test of English Usage.

Results on the pre-test for the thirty eleventh graders were significantly better than for the group as a whole. Seventeen of these students tested at or above their grade levels on the Nelson-Denny and Iowa Silent Reading Tests, and eighteen students were in this category on the California Advanced Mathematics Test. Nineteen of these students ranked at or above the fiftieth percentile on the California Test of English Usage, while the I.Q.'s of twenty-six eleventh graders ranged between 85 and 114 on the Henmon-Nelson Test of Mental Maturity. The I.Q.'s of two of these students tested above 114.

In our pre-planning conferences it was decided to provide instruction mainly in the areas of literature, reading, and mathematics. Students who demonstrated weaknesses in English fundamentals and in mathematics computation were to be given special instruction through the use of programmed learning materials and the employment of teaching machines.

Eight sections of literature and mathematics and nine reading sections were created on the basis of the test scores made by the students on the Nelson-Denny Reading Tests.³ Twenty students were assigned to each literature section, while ten students were enrolled in each of four sections in reading, twenty each in three sections, and thirty in two sections. Eight sections of mathematics were created—four for the teaching of traditional mathemaics and four modern mathematics sections.

In addition to the Director, eleven highly experienced instructors participated in the Pre-Freshman Program (three in reading, four in literature, and four in mathematics). The eleven instructors were assisted by ten teaching assistants (four in reading, three in literature, and three in mathematics). Nine of the teaching assistants were graduates of such universities as Harvard, Yale, Columbia, Princeton, Howard, and New York; three of the teaching assistants were pursuing work beyond the master's degree. A tenth teaching assistant had completed the junior year at Stanford University. The teaching assistants aided instructors in the classes, corrected papers, provided tutorial instruction for individuals and small groups, and performed other assigned duties.

Students in the literature course were assigned a minimum of seven paperbacks during the eight-week period of instruction—J. D. Salinger's *Catcher in the Rye*, *A Farewell to Arms* by Ernest Hemingway, John Steinbeck's *Grapes of Wrath*, *Go Tell It on the Mountain* by James Baldwin, Ralph Ellison's *Invisible Man*, *Native Son* by Richard Wright and *Huckleberry Finn* by Mark Twain.

³Grade equivalents for the nine reading sections are as follows: (1) Section A, -7 to 7.6; (2) Section B, 7.6 to 8.3; (3) Section C-1, 8.5 to 8.9; (4) Section C-2, 8.9 to 9.0; (5) Section D, 9.0 to 9.6; (6) Section E, 9.6 to 10.4; (7) Section F, 10.6 to 11.3; (8) Section F, 11.9 to 12.1; and (9) Section H, 12.3 to 14+.

Emphasis in the reading program was placed upon increasing reading comprehension and rate of reading and in building vocabulary. Nineteen films, which were rented from Pix Film Service, were shown to students in the nine reading sections.⁴ Tape records, special phonograph records, readers which were designed for students of varying reading levels, and standardized reading tests were utilized in the reading program.

In addition to a basic textbook, students in traditional mathematics used programmed materials, while those in modern mathematics followed assignments in an appropriate textbook. In general, students who demonstrated the greatest deficiencies in mathematics were assigned to modern mathematics sections. In assessing the strengths and weaknesses of the Pre-Freshman Program, mathematics teachers expressed the opinion that this arrangement should not be followed in the future.

Classroom instruction was supplemented by outside activities which were designed to provide varied cultural experiences for the students. During the first two weeks students viewed the Huntley-Brinkley telecast on a daily basis and spent as much as an hour afterwards in discussing current events under the supervision of teaching assistants. When it appeared that daily attendance for this activity interfered with other student obligations, attendance was reduced to two required sessions each week. In addition, participants attended cultural programs which were scheduled for all summer school students, enjoyed activities which were available in the College Center and the gymnasium, and were provided other forms of wholesome recreation.

During the seventh week a questionnaire was administered in order to obtain the impressions of the students regarding the program. Only two of the enrollees stated that they had not derived significant benefits from their participation, although the conclusions of the students regarding the strengths and weaknesses of the programs were far from unanimous. Most of them felt that instruction was generally effective, although some expressed the opinion that certain teachers were not sympathetic enough with their academic problems.

At the close of the eighth week students were again administered the Henmon-Test of Mental Maturity, California Test of English Usage (Form A), Iowa Silent Reading Advanced Test (Form CM), Nelson-Denny Reading Test (Form A), and California Mathematics Advanced Test (Form W.)

On the Henmon-Nelson post-test in which 156 students participated, 66 (42.3%) made higher scores than on the initial test; 75

⁴Films shown in the reading program were (1) Build Your Vocabulary; (2) How Effective Is Your Reading; (3) Homework; (4) Learning From Class Discussion; (5) Do Better on Your Examinations; (6) Importance of Making Notes; (7) Find the Information; (8) How to Remember; (9) How to Read a Book; (10) It's Fun to Read Books; (11) Literature Appreciation; (12) Reading Improvement; (13) Improve Your Reading; (14) How to Read Newspapers; (15) Look It Up!; (16) Building An Outline; (17) How to Prepare a Class Report; (18) How to Judge Facts; and (19) Propaganda Techniques.

(48%) had lower scores and the scores of fifteen students (9.7%) remained unchanged. The relatively disappointing performance of many students possibly can be accounted for by the fact that this test was the last to be administered on a humid and muggy afternoon in a room that was not air-conditioned. Declines in raw scores on the Henmon-Nelson Test were not statistically significant. On the other hand, most of the raw scores of students whose I.Q.'s increased were markedly improved.

Results for the California Test of English Usage were more encouraging, since 68 (43.9%) of the 155 students who were examined improved in terms of percentile rank. Forty-two (27.1%) of the students made lower scores and 45 (29%) remained in the same percentile rank. Among students whose total scores improved, there were often pronounced changes. One student ranked at the first percentile in English usage on the initial test and at the fortieth percentile when re-examined; another was at the twentieth percentile at the outset and at the eightieth percentile on the retest. On the other hand, a student who ranked at the sixtieth percentile on the first test was at the fifth percentile when retested. Generally speaking, there was no marked change in total scores among students whose percentile ranks declined.

Results on the Iowa Silent Reading retest were somewhat better than those on the Nelson-Denny retest. On the Iowa Silent Reading Test, 116 (76.3%) of the 152 students who were re-examined were at a higher grade equivalency, twelve (7.9%) were at a lower grade equivalency, and the grade equivalency for 24 (15.8%) remained the same. On the Nelson-Denny Test 102 (65.4%) of the students improved in terms of grade equivalency, 46 (29.5%) declined, and eight (5.1%) remained the same.

Results achieved on the Iowa Silent Reading Test at the beginning of the program indicated that 111 (73%) of the 152 students were below their appropriate grade level in reading; 73 (48%) were in this category in August. On the Nelson-Denny Test, 122 (78.2%) of the 156 students examined were not reading at their grade level at the outset and 93 (59.6%) at the conclusion of the program. On the Iowa Silent Reading Test, fourteen (9.2%) of the students ranked at or above the fiftieth percentile in June, and 41 (27%) in August.

Comparative results of the number of words read per minute on the Nelson-Denny Reading Test are available for only 123 students. One hundred and twenty-three (87.8%) of the students improved in reading rate and fifteen (12.2%) did not. Sixteen students more than doubled their initial reading rate. On the initial tests the number of words read per minute ranged from 75 to 511; the range at the conclusion of the program was from 74 to 615. A student who read 85 words per minute in June was reading in August at the rate of 333 words per minute; the reading rate of another student increased from 153 to 430. On the other hand, one participant who read 188 words per minute on the first test covered only 74 words per minute in August.

On the Iowa Silent Reading Test, which was administered in August, 120 (77.9%) of 154 students were at a higher grade placement, seven (4.6%) experienced a decline, while the grade placement of 27 students (17.5%) remained the same. One participant increased in grade placement from 4.8 to 9.8 and another from 7.0 to 14. However, one student's grade placement was 14.0 in June and 10.0 in August.

The pre-freshmen achieved their best results on the California Advanced Mathematics Test. When the California Advanced Mathematics Test was given in June, 29 (18.8%) of the 154 students ranked at or above the fiftieth percentile; 57 (37%) were at or above the fiftieth percentile in August. On the retest 145 (94.2%) of the 154 students improved in grade placement, 6 (3.9%) declined, and the grade placement for these students (1.9%) remained unchanged. In terms of percentiles, 116 (75.3%) were above their initial ranking, 2 (1.3%) were below, and 36 (23.4%) remained unchanged. One student advanced from the first to the fortieth percentile and another from the second to the ninety-fifth percentile. Twenty-eight students, however, who were in the first percentile initially did not improve in percentile ranking, although 25 of these students made some improvement in grade placement.

It is possible that mediocre performances by some of the students may have been due to vision or hearing defects. Before the conclusion of the program, vision and hearing tests were conducted by the reading teachers. Of the 133 students who were given the vision test, 98 (73.7%) failed the test, three had questionable vision, six needed to wear glasses which they had previously purchased, one required corrective eye habits, and only 25 (18.8%) had perfect vision. Results on the hearing test were more satisfactory. Of the 119 students who were administered this test, 85 (75.5%) seemed to have perfect hearing, 31 (25%) failed the test, and three (2.5%) had hearing defects. Even though the tests were administered by laymen, it is reasonable to assume that they were not without merit.

The eleven teachers who provided instruction in the Pre-Freshman Program made written evaluations following its conclusion. Among its major achievements, as listed by the teachers were (1) most of the students learned how to budget their time and the importance of using the library; (2) students experienced for the first time some of the rigors and rewards of intellectual effort and became aware of the social give-and-take exacted by dormitory life; and (3) significant and even dramatic improvement in reading comprehension and rate, mathematical computation, and literary appreciation were achieved by large numbers of the young people. Despite the fact that the teachers recognized that certain improvements and refinements should be made in future programs, they were unanimous in stating that it contained more pluses than minuses. One teacher expressed the sentiments of her colleagues when she wrote: "For the student who was insufficiently prepared, the Program afforded a wonderful second chance. It should reduce considerably the high percentage of persons from this group who would normally take remedial classes when they enter college."

The teachers were high in their praise of the performances by most of the students who had completed only the eleventh grade. Except for five of the thirty eleventh graders, the test scores for these students were at least as satisfactory as the average scores made by students who had completed the twelfth grade. As a result of superior test scores and outstanding classroom performances, twelve of the eleventh graders were invited to enroll at Tuskegee Institute in the fall of 1964. While the **Tuskegee Pre-Freshman Program** was not initially designed as an accelerating device for bright youngsters who had not completed high school, such recognition of talent was as satisfying an outcome as the positive results which were achieved by many of the high school graduates.

Desegregation and Library Education

by

E. J. Josey

The year 1964 marked the tenth anniversary of the United States Supreme Court's decision which destroyed the legal basis for segregated education. As this historic decision is viewed in retrospect, it seems appropriate to examine the nine accredited library schools which were, at some point in their history, segregated institutions, in order to ascertain to what extent desegregation has taken place in these library schools.

The writer is the chief librarian at Savannah State College and in addition is also responsible for the teacher-librarian certification program. Therefore, in recent years, he has become concerned about the small number of Negro students who are choosing librarianship as a career. In view of the proximity of the nine southern accredited library schools to Negro colleges, a questionnaire was drawn up in the summer of 1964 and circulated to the deans of these schools,¹ for the purpose of coming to grips with the problem.

The instrument was introduced by the following statement:

Over the years, Negro college graduates, by and large, have gone into the traditional professional fields, e.g., teaching, law, medicine, and the ministry. There is a dire need to recruit more able people for librarianship. Negro educators and guidance counselors seem to be convinced that more young people should be recruited for the non-traditional fields, engineering, mathematics and the sciences, but they never seem to encourage these young people to study library science. From a librarian's point of view, this is rather disconcerting and frustrating, when he hears his colleagues urging Negro collegians to break away from the traditional fields and seldom or never mention librarianship, and, at the same time, librarianship is a fertile field for recruits.

It was felt that the dean of each library school should ask himself these questions in order to present a clear picture of desegregation in their formerly all-white library schools: (1) How many Negro students are currently studying at your library school? (2) How many Negro graduates did you have in June? (3) How many Negro students completed your program in the last two years? (4) Do you notify Negro colleges regarding the possibility of their graduates studying librarianship at your institution? (5) Do you send scholar-

¹These schools included Emory, Florida State, Kentucky, Louisiana State, North Carolina, Oklahoma, Peabody, University of Texas, and Texas Woman's.

ship and recruitment material to the counselors of Negro colleges? (6) If you have overlooked this possible source of student-supply, would you be willing to institute a program of encouraging Negro students to study at your library school? (7) Do you presently have a Negro on your faculty? and (8) Would you be willing to employ a Negro professor on your faculty?

The deans of all nine library schools responded. Nevertheless, several failed to answer all of the questions. From the data which were collected, certain implications emerged which will be of paramount importance for improving this situation or for making positive recommendations.

During the 1963-1964 academic year and the 1964 summer session, a very limited number of Negro students are recorded to have been registered in these nine (9) institutions. This infinitesimal number is shown in Table 1.

TABLE 1. Negroes Studying in Accredited Formerly All-White Library Schools in 1964.

	Regular Session	Summer Session, 1964	No Negro Students	Extension Center	Statistics Unavailable
Emory			0		
Fla. State	1 part-time			5	
Kentucky					x
La. State		14			
N. C.		5			
Oklahoma		4			
Peabody					x
Texas		2			
Texas Woman's	2	5			

The above table presents answers which give a partial picture of the number of Negro students studying in southern formerly all-white library schools. It can be seen that the highest per cent of these Negro students attended the 1964 summer session and that there were more Negroes in attendance at one extension center than were recorded among on-campus Negro students in library science at these colleges that year. This is a tragic waste of human resources which could alleviate the shortage of professional librarians.

Because of a genuine attempt to bring Negroes into the main stream of American culture, it has become more difficult to record Negro citizens as Negroes. Several library school deans indicated that they are forbidden to keep records by race; hence, their statistics may

not be accurate. This fact was recently pinpointed by the following statement: "It is becoming increasingly difficult to answer that question because administrators are reluctant to maintain any figures by race. However, on the basis of certain official figures and some good estimates, the situation can be summarized fairly accurately."²

Although statistics were unavailable from Kentucky and Peabody, this writer is aware of the fact that both library schools have had several Negroes to graduate during the last two or three years. Maurice D. Leach, the Chairman of the Department of Library Science at Kentucky writes ". . . we are puzzled by your questionnaire and statements in the covering letter, in that the University of Kentucky graduate program has been integrated for approximately twenty years." The foregoing statement is a little less than accurate, because Lyman T. Johnson, the Negro school teacher of Louisville won his suit in 1949 and entered the University's History Department in the summer session of 1949. In spite of the fact that records are not maintained according to race or religion at Kentucky or Peabody "on the basis of certain official figures and some good estimates," approximate figures could have been given.

Louisiana State bursts forth with the largest enrollment of 14 attending summer school. North Carolina, Texas Woman's and Oklahoma follow with 5 and 4 respectively. With the University of Texas having 2 and Emory none. Carlyle J. Farery of North Carolina and Robert R. Douglass of Texas indicated that during the past several years, both library schools have had Negro teachers who were working toward school library certification and not towards a degree. From the foregoing analysis, it appears that the southern library schools are not attracting large numbers of Negro students.

Concerning question two, 6 reported that they did not have a single Negro graduate in June, while Oklahoma boasts of one and no statistics were provided by Kentucky and Peabody.

With regard to question three, 4 reported no Negro graduates during the last two years; Louisiana State reported 2; Oklahoma indicated 3; North Carolina stated 1, with no report from Kentucky and Peabody.

By and large, we may assume from the foregoing data that those Negro students who do not attend the Atlanta University Library School are receiving their library education in other areas of the country. These findings corroborate Pollard's findings regarding Negro College chief librarians, when she stated that "and more than 60 per cent . . . chose library schools located outside the South."³

Question 4 sought to elicit answers regarding notices being sent to Negro colleges relative to the possibility of their graduates studying librarianship at the respective library schools in the region. We find

²Guy B. Johnson, "Desegregation in Southern Higher Education," *Higher Education*, 20: (June, 1964), 6.

³Frances M. Pollard, "Characteristics of Negro College Chief Librarians," *College and Research Libraries*, 25: (July, 1964), 283.

that 3 answered affirmatively and 2 responded negatively; 3 provided no answers and 1 indicated that materials would be sent upon request.

The answers to question 5 are varied and interesting, for 3 stated that they send scholarship and recruitment materials to counsellors in Negro colleges and 2 gave negative replies; 3 failed to answer and 1 said that materials would be sent upon request.

It appears that most of these library schools have failed to contact Negro colleges or their counsellors. The truth of the matter is that if the counsellors are made aware of the opportunities in librarianship, then these educators would be in a better position to guide young people into librarianship. If library school heads do not wish to mail out circular material, then they may wish to accept Harold Lancour's advice ". . . a few library school directors make extended trips through a specific area, visiting by prearrangement a number of colleges and libraries, talking informally with counsellors, placement officers and groups of students."⁴

Before leaving recruitment, a word or two should be mentioned, specifically, with reference to certain comments made relative to guidance counsellors. Robert Clapp, Assistant Dean of Florida, writes "Since Guidance Counsellors recommend to us what seems to us the most unlikely applicants that apply—the physically handicapped, socially maladjusted, and the academically weak who have difficulty getting jobs and holding them—we make no effort to encourage their efforts." I do not pretend to have the answer for Mr. Clapp, but it is my belief that it is the library school's responsibility to inform the counsellors relative to the type of applicants that are desired for graduate library education. Those who are socially maladjusted or academically weak, should not be encouraged; but, on the other hand, those candidates whose physical disabilities will not be too much of a hindrance to providing effective library service should be encouraged.

Mrs. Frances Neel Cheney, The Associate Director of the Peabody Library School stated, "We are eager to recruit able students regardless of race or creed and will continue to encourage qualified graduates to apply to Peabody." Obviously, these words do not clearly commit her school to this liberal policy, for it seems that it would be terribly difficult for Negro college graduates to be aware of this policy, if the Peabody Library School will continue to ". . . send scholarship and recruitment materials to all counsellors who request it."

Turning to question six, it was discovered that 4 library school directors declared that they would be interested in instituting a program of encouraging Negro students to study at their library school, while 4 failed to respond and 1 claimed that recruitment is handled by a separate bureau on campus and not by the library school.

⁴Harold Lancour, "The Role of the Library School," *Library Journal* 87: (December 1, 1962.) 2839.

Recruitment is the responsibility of the library profession as a whole, but it seems to me that the confrontation of the college graduate with many possible fields of endeavor beckoning him to come, library schools, then, must plan bold and imaginative programs of recruitment for Negro college graduates as well as non-Negro college graduates. In short, library schools must bear their own responsibilities in this area. I can not find a justification for Maurice D. Leach's statement that "our promotional literature and newsletters go to all former students and alumni and to those interested in studying library science at the University of Kentucky." What kind of program does Mr. Leach envision for attracting Kentucky State College graduates to his program?

Question seven was designed for the purpose of ascertaining if Negroes are employed on the faculty of these library schools. All nine library schools responded negatively. Nevertheless, Peabody and the University of Texas indicated that Negro professors serve in other departments of their institutions.

Closely related to question seven, the final question sought to determine if the director or the dean of the library school would object to employing a Negro professor. The replies are significant for they are indices to the philosophy of the library school director, in some instances, and the prevailing attitude of the parent institution in others. The findings revealed that 4 would employ a Negro professor and 3 answered negatively while 1 failed to respond.

Some of the comments on this question are worth repeating. Leach of Kentucky stated "It is the policy of the University to employ the people whose qualifications are the best for a given position." The Assistant Dean of Florida State asserted, "We have no Negroes on our faculty and I personally would not recommend employing one until I feel that he could carry his part of our teaching load without any more frustration than is endured by the other faculty members." Since Dean Clapp does not define "frustration," it would be rather hazardous for me to guess. However, I can not refrain from reminding him that Negroes are serving full-time or part-time on the faculties of Columbia, University of Washington, Pratt, St. Johns and Drexel without any more frustration than their Caucasian colleagues.

Dean Fraey of North Carolina pointed out that "since the School of Library Science is a graduate department, appointments to the grade of Assistant Professor or higher now require that the candidate have completed a doctoral degree, or that he be well-advanced towards completion of that degree. This requirement gives us serious difficulty in recruiting faculty, for there are very few librarians of any race who meet it except for those who may already be employed in another library school."

Except for certain salient facts, there is no need to repeat the findings in this summation, for they are self evident. Generally, a sizable number of Negroes are now studying in formerly all-white library schools in the South, but most of these students study during

the summer sessions, and a large number are seeking only certification for school library positions. Those who are not studying at the Atlanta University Library School are studying in the North, the Mid-West and the West. By and large, the library schools of the South have failed to recruit Negro students. Most of the desegregation in higher education has stemmed from the Negro students' desire to remain and study in the region rather than being encouraged by recruitment officers of formerly all-white southern universities.

Viewing the problems of desegregation in library education from a broad-based point of reference is inescapable. Speaking in broad terms, but realistically, as we assess the role of library schools in the South in the education of Negroes, firstly, we must be ever mindful that, with the exception of Howard, Lincoln, and Cheyney State, all of the predominant Negro colleges in America are in the South, the same region of the Southern library schools. Secondly, it is less expensive for Negroes to be educated in the region within the framework of desegregation. Thirdly, since Negro students have not been in the mainstream of American culture, and since there are still too many Negroes who are reluctant to do graduate study in the South, school administrators have a responsibility to make a bold attack and recruit able Negro collegians for study in the area of librarianship.

As we look into the future, we agree with the distinguished sociologist of North Carolina who writes "The transition from complete segregation to a rather high degree of desegregation in southern higher education in the past 15 years is almost a miracle in the annals of social change. The necessary regulative and structural changes will soon be completed, but there remains the task of arriving at the condition of equality of status and opportunity implied in the term 'integration.'"⁵

Equality of status and opportunity must be provided for Negro students and Negro faculty in southern Library Schools. The constant endeavor of the dean or director of the library schools in the South must be to improve the climate for study and research for the South's Negro citizens who desire librarianship as their life's work. In fact, the future of southern libraries may very well depend on the extent to which southern library schools educate Negroes for positions of library leadership.

⁵Guy B. Johnson, *op. cit.* 7, 10.

Certain Condensation Reactions with Copper Powder as a Catalyst

by

Kamalakar B. Raut*

In 1904 Ullmann (1) was able to show that copper powder readily eliminates the iodine from aromatic iodo-compounds yielding cuprous iodide and derivatives of diphenyl. A few years later (2) it was shown that the reagent acts catalytically in condensing halogenated benzenes with metallic phenoxides, thus providing a simple method for preparing substituted diphenyl oxides; still later (3) Ullmann showed that the copper reacts catalytically in removing hydrogen halides from aromatic amines and halogenated benzenes, yielding substituted diphenylamines. Thus aniline and p-chloronitrobenzene yield p-nitrodiphenylamine. The yields are quite good when potassium carbonate is added, as this not only neutralizes the hydrogen halide formed during the reaction, but also stabilizes any carboxylic acids by converting them into potassium salts. The method is a general one for preparing arylanthranilic acids (4). With halogen or methoxy-substituted amines the addition of amyl alcohol is advisable. In a similar manner 2-chloro-4-nitrobenzoic acid condenses at 180° with sodium phenoxide yielding 5-nitrodiphenylether-2-carboxylic acid (5). In some cases a mixture of copper and potassium iodide or even cuprous iodide gives good results.

The replacement of halogen in aromatic halides by hydroxyl is readily effected by heating the compound with sodium acetate at 140-150° in the presence of a little copper powder. By this process salicylic acid is readily obtained from o-chlorobenzoic acid, and halogen can be replaced by carboxyl by heating the halogenated benzene with aqueous alcoholic potassium cyanide and cuprous cyanide at 260° (7).

Reactions of aniline with carbon tetrachloride and with chloroform in presence of copper powder are presently being studied. From reactions of aniline and carbon tetrachloride three compounds melting at 167°, 258°, and 267°C have been isolated. From the reaction of aniline and chloroform a compound melting at 209° was isolated. The structural studies of these compounds are under progress and will be reported later. It appears that the four compounds isolated have not been isolated before.

Experimental

Three moles of aniline, carbon tetrachloride, [25.5cc] and copper mesh powder [E. H. Sargent & Company, Chicago, Illinois] mea-

*The investigator is indebted to Jannie Singleton and Laura Grant, both students, at Savannah State College, for their cooperation and assistance.

sured on the tip of a spatula were refluxed for two hours over a steam bath. The refluxing was discontinued when a hard black solid was present. The solid was allowed to cool and subjected to steam distillation using a 10 per cent solution of sodium hydroxide. After the solid had been distilled until a clear liquid began to distill off, the solid left during distillation was filtered from the liquid by use of a buchner funnel, ground, and dried. The dry solid was then extracted with a 7 per cent solution of sulfuric acid. The filtrate was allowed to cool to 10°C, and refiltered. To the filtered solution, cold ammonium hydroxide solution was added slowly to the liquid until the solution was neutralized. The entire solution was refiltered using a suction funnel. The precipitate was dried, and purified through recrystallization. The purified compound was dried and the melting point was taken. It was found to be 167°C.

The solid left after extraction with 7 per cent sulfuric acid was then extracted with alcohol, filtered, allowed to dry, and the melting point taken which was 258°C. Finally, the remaining solid from the above two extractions was dried, and its melting point was taken. It was 267°C.

27.9 ml of aniline, 20.8 ml chloroform, and a little copper powder were refluxed for 10 hours on the water bath. The reaction mixture was made alkaline with 10 per cent solution of sodium hydroxide and steam distilled. The solid which remained behind was washed with 7 per cent sulfuric acid and crystallized from alcohol. White flakes melting at 209°C were obtained.

References

1. F. Ullmann, *Annalen*, 1904, 332, 38.
2. F. Ullmann and S. Shangel, *ibid.*, 1906, 350, 83.
3. F. Ullmann, 1907, 355, 312.
4. M. Goldbert, *Ber.*, 1906, 39, 1691, 1907, 40, 2448.
5. F. Ullmann and G. Wagner, *Annalen*, 1907, 355, 361.
6. M. Goldberg, *Ber.*, 1907, 40, 4541.
7. K. W. Rosenmund and P. Struck, *Ber.*, 1919, 52, 1749.

Qualifications of College Teachers: 1918-1962

by

Phillip D. Vairo

It is the purpose of this article to review and to comment upon the research which has been reported in professional literature dealing with the qualifications of college teachers during the past fifty years. Particular attention has been given to teachers in two-year institutions. The qualifications of college teachers have been reviewed under the following headings: (1) academic preparation, (2) teaching experience, (3) publications, and (4) membership in professional organizations. Practical considerations have limited the number of studies included in this investigation.

Academic Preparation

McDowell, in 1919, compared the qualifications of teachers in private and public junior colleges with those of teachers instructing in the lower-division of four-year colleges and universities. The study included 523 teachers from 66 junior colleges, 58 teachers from 3 four-year colleges, and 233 teachers from 3 universities.¹

The investigation revealed that 8.2 per cent of the private junior college teachers held doctor's degrees, 27 per cent held master's degrees, 52 per cent held bachelor's degrees, 11.7 per cent did not hold degrees, and 1.1 per cent were unclassified. The sample included a total number of 343 teachers from private junior colleges. In investigating the qualifications of 180 public junior college teachers McDowell found that only 2.8 per cent held doctor's degrees, 39.5 per cent held master's degrees, 45 per cent held bachelor's degrees, 11.6 per cent did not hold degrees, and 1.1 per cent were unclassified. Of the four-year college teachers, 26 per cent held doctor's degrees, 41 per cent held master's degrees, 26 per cent held bachelor's degrees, 1.8 per cent held no degrees, and 5.2 per cent were unclassified. Of the university teachers, 60 per cent held doctor's degrees, 25.6 per cent held master's degrees, 12.7 per cent held bachelor's degrees, 0.4 per cent held no degrees, and 1.3 per cent were unclassified. In summary, the study showed that the median teacher of the university held a doctor's degree, the median four-year college teacher held a master's degree, and the median junior college teacher held a bachelor's degree.²

¹Floyd M. McDowell, "The Junior College," *United States Bureau of Education Bulletin*, No. 35 (Washington: U. S. Government Printing Office, 1919), p. 54.

²*Ibid.*, p. 56.

Koos, in 1924, also compared the qualifications of junior college teachers with those of teachers giving instruction in the lower-division level of four-year colleges and universities. Koos' study included 129 teachers from private junior colleges and 163 teachers from public junior colleges. He reported that 1 per cent of the teachers in the private junior colleges held doctor's degrees, 34 per cent held master's degrees, 60 per cent held bachelor's degrees, and 5 per cent did not hold degrees. Three per cent of the teachers in the public junior colleges held doctor's degrees while 47 per cent held master's degrees, 47 per cent held bachelor's degrees, and 3 per cent did not hold degrees.³

Koos found that of the four-year college teachers instructing on the freshman and sophomore levels, 18.2 per cent held doctor's degrees, 40.9 per cent held master's degrees, and 40.9 per cent held bachelor's degrees. Of the university teachers instructing in the lower-division, 10.8 per cent held doctor's degrees, 55.4 per cent held master's degrees, and 33.8 per cent held bachelor's degrees.⁴

Additionally, Koos pointed out that preparation for teaching is not solely one of academic degrees. It is also a question of preparation in the subject fields in which the teacher is giving instruction. He found that three-fourths of the public junior college teachers and Northern private junior college teachers he investigated and 86 per cent of the four-year college teachers had an undergraduate major in the subject they taught.⁵

Koos showed in his study that the public junior college and Northern private junior college teachers both surpassed the four-year college and university teachers in the preparation of semester-hours of work in education. The study revealed that teachers in the Northern private junior colleges had completed an average of 21 semester-hours in education and the public junior college teachers had completed an average of 16 semester-hours of work in education. The four-year college teachers averaged 5 semester-hours of work in education while the university teachers averaged only 2 semester-hours of work in education.⁶

In 1927, Morris found that 7 per cent of the teachers in California junior colleges held doctor's degrees, 40 per cent held master's degrees, 36 per cent held bachelor's degrees, and 17 per cent held no degrees.⁷

³Leonard V. Koos, *The Junior College Movement* (Boston: Ginn and Company, 1925), p. 67.

⁴*Ibid.*, p. 68.

⁵*Ibid.*, pp. 70-71.

⁶*Ibid.*, p. 73.

⁷Charles S. Morris, "The Junior College Faculty," *The Junior College Its Organization and Administration*, (ed.) William Martin Proctor (Stanford, California: Stanford University Press, 1927), p. 47.

In 1928, Martens reported the academic preparation of 554 teachers from 26 junior colleges in California. The study showed that 6.5 per cent held doctor's degrees, 46.4 per cent held master's degrees, 37.4 per cent held bachelor's degrees, and 9.7 per cent held no degrees.⁸

An investigation of the Stanford University faculty revealed that 72 per cent of all lower-division instruction at the university was given by teachers of professorial rank. The study also pointed out that 58 per cent of the teachers instructing on freshman and sophomore levels held doctor's degrees.⁹

Wahlquist investigated the highest degree held by 1,236 teachers from 222 junior colleges in 39 states. He found that 5 per cent held doctor's degrees, 59 per cent held master's degrees, 29 per cent held bachelor's degrees, and 7 per cent had no degree.¹⁰

Garrison obtained responses from 716 teachers in 51 public junior colleges. His study revealed that the majority of teachers had undergraduate majors or minors in the subject field which they were teaching; however, there was a minority of teachers instructing in subjects in which they had no preparation. Garrison also reported that the master's degree was held almost universally among the junior college teachers in his study.¹¹

Approximately two decades after his first study, Koos again gathered data from 48 public junior colleges in California and 8 states in the Midwest and South. The number of teachers involved in the second study was 1,458.¹²

Koos found that 6.3 per cent of the teachers held doctor's degrees, 63.6 per cent held master's degrees, 26.8 per cent held bachelor's degrees, and 3.3 per cent held no degrees.¹³

He found that 38.2 per cent of the respondents had a graduate and undergraduate major in the subject they taught, 26.4 per cent had a graduate or undergraduate major in the subject taught, 18.5 per cent had a graduate or undergraduate minor in the subject taught,

⁸E. H. Martens, "Training and Experience of Teachers in the Junior Colleges of California," *California Quarterly of Secondary Education*, IV (1928-29), 51.

⁹Walter Crosby Eells, *The Junior College* (Boston: Houghton Mifflin Co., 1931), p. 402, quoting from an unpublished study by Miss Maxine Whitney, at Stanford University.

¹⁰J. H. Wahlquist, "The Status of the Junior College Teacher," *Junior College Journal*, I (November, 1930), 130.

¹¹L. A. Garrison, "Preparation of Junior College Instructors," *Junior College Journal*, XII (November, 1941), 135-136.

¹²L. V. Koos, "Junior College Teachers: Degrees and Graduate Residence," *Junior College Journal*, XVIII (October, 1947), 78.

¹³*Ibid.*, p. 79.

and 16.3 per cent had no graduate or undergraduate major or minor in the subject taught. No answer was received from .6 per cent of the respondents.¹⁴

In his first study, Koos reported that the average number of semester-hours of work completed in education was 16 for the public junior college teacher. In 1941, the average number of semester-hours of work completed in education by the junior college teacher was increased to 29.¹⁵

The preparation of academic and special subject teachers such as art, music, physical education, and home economics was of special interest to Koos in his investigation. He found that 83.8 per cent of the academic teachers held advanced degrees while only 43.8 per cent of the teachers in special subjects held such degrees. The percentage of academic teachers without degrees was reported to be negligible. On the other hand, 9.1 per cent of the special subject teachers did not hold degrees.¹⁶

Reynolds, in 1953, compared the qualifications of 124 social studies teachers in 45 junior colleges with 173 social studies teachers giving instruction in the lower-division of liberal arts colleges, teachers colleges, and universities. He found that 82.3 per cent of the teachers in the two-year colleges possessed the master's degree as the highest academic degree, and 13.7 per cent held the doctor's degree. Of the teachers instructing in the lower-division of the four-year colleges, it was reported that more than half of the teachers held the doctor's degree as the highest academic degree. Approximately 3 per cent of all the teachers, on all levels, held only the bachelor's degree as the highest degree.¹⁷

Pattillo and Pfinster obtained data from 330 member institutions of the North Central Association in 1952-53. The number of teachers involved in the study was approximately 30,000 from universities, four-year colleges, and public and private junior colleges.¹⁸

Of the teachers in the four-year colleges and universities 36.1 per cent held doctor's degrees, 47.5 per cent held master's degrees, 9.4 per cent held bachelor's degrees, 1.2 per cent held no degrees, and 5.8 per cent were unclassified.¹⁹ In public junior colleges 6 per cent of the teachers held doctor's degrees, 82 per cent held master's degrees, 10 per cent held bachelor's degrees, and 2 per cent were un-

¹⁴ L. V. Koos, "Junior College Teachers: Subjects Taught and Specialized Programs," *Junior College Journal*, XVIII (December, 1947), 207.

¹⁵ L. V. Koos, "Junior College Teachers: Preparation in Education," *Junior College Journal*, XVIII (February, 1948), 334.

¹⁶ L. V. Koos "The Junior College Teachers: Degrees and Graduate Residence," *Junior College Journal*, XVIII (October, 1947), 79.

¹⁷ J. W. Reynolds, "The Social Studies Instructor in the Junior College and the Lower Division Level," *Social Studies in College*, National Council for the Social Studies Curriculum Series No. 8 (January, 1953), 88-90.

¹⁸ M. M. Pattillo and A. O. Pfinster, "Faculty Training and Salaries in Institutions of Higher Education," *North Central Association Quarterly*, XXIX (April, 1955), 374.

¹⁹ *Ibid.*, p. 378.

classified. In private junior colleges 12.9 per cent of the teachers held doctor's degrees, 67.1 per cent held master's degrees, 16 per cent held bachelor's degrees, and 4 per cent were unclassified.²⁰

Colvert and Baker reported the highest degree held by 6,985 public junior college teachers for the year 1954-55. The percentage of teachers holding doctor's degrees was 7.2 while 68.5 per cent held master's degrees, 17.9 per cent held bachelor's degrees, and 6.4 per cent held no degree.²¹

Kinerson studied the academic background of 186 junior college teachers of physical science teaching in 124 junior colleges in 37 different states. The study revealed that 13 per cent held doctor's degrees, more than three-fourths held master's degrees, and about one-third of these had work completed beyond the master's degree. A small percentage held less than the master's degree.²²

Kinerson also reported that nearly two-thirds of the teachers studied had completed approximately 15 semester-hours of work in education on the undergraduate level. He went on to state that the same number of teachers had graduate work in education with about 16 semester-hours in education completed.²³

Rainey compared the academic preparation of accounting teachers in junior colleges, four-year colleges, and universities in Oklahoma in 1958-59. The investigation disclosed that there was not one doctorate in the ranks of the junior college teachers, whereas 13.8 per cent of the teachers in four-year colleges and universities held doctor's degrees. Of the junior college teachers 76.6 per cent held master's degrees as compared to 67.2 per cent of the teachers in four-year colleges and universities. The bachelor's degree was held by 23.4 per cent of the junior college teachers as compared to 19 per cent for the four-year college and university teachers.²⁴ It was also reported that junior college teachers had completed an average of 20 semester-hours of work in accounting while the four-year college and university teachers had completed an average of 40 semester-hours of work in accounting.²⁵

During the period 1954-58 it was found that 70 per cent of the new teachers on the faculty of the University of California held doctor's degrees, and 40.2 per cent of the new appointees at the

²⁰*Ibid.*, p. 382.

²¹C. C. Colvert, "Professional Development of Junior College Instructors," *Junior College Journal*, XXV (April, 1955), 476.

²²Kendall Scott Kinerson, "A Study of the Academic and Professional Preparation of Junior College Teachers of Physical Science," (unpublished Ph.D.) dissertation, Dept. of Education, Michigan State University, 1957), p. 115.

²³*Ibid.*, p. 114.

²⁴B. G. Rainey, "An Analysis of Criticisms of Junior College Teachers by University and Senior College Staffs," *Junior College Journal*, XXX (December, 1959), 209.

²⁵*Ibid.*, p. 211.

state colleges held doctor's degrees. Comparable data for the junior colleges for this period were not available. For the year 1959-60 it was reported that only 7 per cent of the new faculty members in the 59 junior colleges in California held doctor's degrees.²⁶

Medsker gathered data from 3,895 teachers in 74 two-year colleges. He reported that three-fourths of the teachers held graduate degrees, 64.6 per cent held master's degrees, and 9.6 per cent held doctor's degrees. Furthermore, 17 per cent of the teachers held bachelor's degrees, 6.7 per cent held no degrees, and 2.1 per cent were unclassified.²⁷

The Research Office of the State University of New York compiled a report on the instructional staff of the public community colleges in the fall of 1959. The study revealed that of the 661 teachers in the community colleges, 9.7 per cent held doctor's degrees, 52.2 per cent held master's degrees, 27.5 per cent held bachelor's degrees, and 10.6 per cent were unclassified.²⁸

Since the year 1953-54 the Research Division of the National Education Association has studied the academic preparation of teachers in two-year colleges, four-year colleges, and universities. In 1953-54, the Division reported that among 58,719 teachers in four-year colleges and universities 40.5 per cent held doctor's degrees, 20.9 per cent held master's degrees plus one year of additional graduate study, 28.2 per cent held master's degrees, and 10.4 per cent held less than master's degrees.²⁹ It was also reported that of all new teachers in four-year colleges and universities in 1953-54, 31.4 per cent held doctor's degrees, 51.4 per cent held master's degrees, and 18.2 per cent held less than master's degrees.³⁰

In 1960-61, of all new teachers in four-year colleges and universities it was reported that 25.8 per cent held doctor's degrees, but 17.4 per cent held less than master's degrees.³¹ Of the new teachers in public junior colleges, 6 per cent held doctor's degrees as compared to 7.4 per cent of the new teachers in private junior colleges. Of the new public junior college teachers, 18.3 per cent held master's degrees plus one year of graduate study as compared to 14.2 per cent for the new teachers in private junior colleges. Master's degrees were

²⁶*A Master Plan for Higher Education in California 1960-75* (Sacramento: California State Department of Education, 1960), p. 123.

²⁷Leland L. Medsker, *The Junior College: Progress and Prospect* (New York: McGraw-Hill Book Co., 1960), p. 172.

²⁸New York State University Research Office, *Professional Personnel* (Albany, New York: State University of New York, 1960), p. 6.

²⁹National Education Research Division, "Instructing Staff Practices and Policies in Degree Granting Institutions," *National Education Association Research Bulletin*, XXXII (December, 1954), 164.

³⁰National Education Research Division, *Teacher Supply and Demand in Universities, Colleges, and Junior Colleges, 1959-60 and 1960-61* Research Report No. 12 (Washington, D. C.: National Education Association, 1961), pp. 12-13.

³¹*Ibid.*, p. 14.

held by 49.8 per cent of the new teachers in public junior colleges and 43 per cent of the new teachers in private junior colleges. Twenty-five and nine-tenths per cent of the new teachers in public junior colleges and 35.4 per cent of the new teachers in private junior colleges held less than master's degrees.³²

Chapin and Vairo compiled a report on the instructional staff of the public two-year and four-year colleges in North Carolina for the school year 1961-62. The study revealed that of the 135 teachers in the two-year colleges, 9.6 per cent held doctor's degrees, 68.1 per cent held master's degrees, and 23.3 per cent held less than master's degrees. From the data gathered from 1,231 four-year college teachers, it was found that 39.1 per cent held doctor's degrees, 53 per cent held master's degrees, and 7.9 per cent held less than master's degrees.³³

Teaching Experience

McDowell found the median years of teaching experience for 516 junior college teachers to be 8.6 years compared to 10 years for 218 university teachers and 12.5 years for 58 four-year college teachers.³⁴

Koos in his 1924 study of the qualifications of junior college, four-year college, and university teachers reported that teachers in public junior colleges had a median of 9.1 years of teaching experience compared to 5.0 years for teachers in private junior colleges. Teachers in four-year colleges had a median of 8.9 years of teaching experience, whereas the university teachers had a median of 4.2 years of teaching experience. Koos did not include teaching experience below the high school level in computing his statistics.³⁵

Martens found that teaching experience among the 554 public junior college teachers in California varied from 2 to 40 years. Only 5 per cent of the teachers had fewer than 2 years of experience, and 5 per cent had more than 25 years of experience. The median number of years teaching experience for the public junior college teacher was 10. The study also showed that 80 per cent of the teachers had high school teaching experience, 34 per cent had college teaching experience, 4 per cent had junior high school teaching experience, and 17 per cent had elementary school teaching experience.³⁶

³²*Ibid.*, pp. 33-34.

³³F. Stuart Chapin and Philip D. Vairo, "Statistical Summary of the Recognitions Received from Outside Organizations by the Faculties of Public Two-Year and Four-year Colleges in North Carolina for the School Year 1961-62" (Raleigh: Board of Higher Education, 1962), p. 8. (In the files of the Board of Higher Education of North Carolina.)

³⁴McDowell, *op. cit.*, p. 58.

³⁵Leonard V. Koos, *The Junior College Movement* (Boston: Ginn & Company, 1925), p. 75.

³⁶Martens, *op. cit.*, pp. 55-56.

Koos, in 1941, reported that only a small minority of the 1,458 public junior college teachers he studied were without high school teaching experience. The number of years of teaching experience on the junior college level varied from 1-2 years for 6.1 per cent of the teachers to over 25 years experience for 17.1 per cent of the teachers.³⁷

Kinerson pointed out that two-thirds of the 186 junior college teachers of physical science he studied had high school teaching experience. The median number of years of teaching experience for the entire group Kinerson studied was 8 years.³⁸

Medsker in his study of 3,895 teachers from 74 two-year colleges found that 64 per cent of the teachers had taught in secondary or elementary schools, mostly in secondary schools.³⁹

Chares and Summerer reported that in the academic year 1957-58 the faculty of Flint Junior College consisted of 54 teachers who had less than 6 years of teaching experience, 57 who had from 6-15 years, 14 who had from 16-25 years, and 19 who had 26 years or more of teaching experience.⁴⁰

Rainey found that four-year college and university accounting teachers averaged 1 year of teaching experience in public elementary or junior high school, 2.4 years in public high schools, and 11 years in four-year colleges and universities. Junior college teachers averaged 1.3 years experience in public elementary or junior high school, 7.4 years experience in secondary schools, and 9.9 years experience in junior colleges, four-year colleges, and universities. The median number of years of teaching experience for the four-year college and university accounting teacher was 14.7 compared to 19.5 for the junior college accounting teacher.⁴¹

The Research Division of the National Education Association reported that junior colleges obtained more new teachers from high school faculties than did four-year colleges in 1960-61. Approximately, 30 per cent of all new teachers in junior colleges came from high school teaching positions.⁴² The four-year colleges drew 12 per cent of their new teachers from high school faculties.⁴³

³⁷L. V. Koos, "Junior College Teachers: Background of Experience," *Junior College Journal*, XVIII (April, 1958), 469.

³⁸Kinerson, *op. cit.*, p. 116.

³⁹Medsker, *op. cit.*, p. 172.

⁴⁰S. F. Chares and K. H. Summerer, "Building a Junior College Faculty," *Junior College Journal*, XXIX (March, 1959), 423.

⁴¹Rainey, *op. cit.*, p. 209.

⁴²National Education Research Division, *Teacher Supply and Demand in Universities, Colleges, and Junior Colleges, 1959-60 and 1960-61*, Research Report No. 12 (Washington, D.C.: National Educational Association, 1961, p. 36.

⁴³*Ibid.*, p. 18.

Publications and Research

Garrison found of the 716 public junior college teachers who replied to his questionnaire only 10 per cent had done research or published materials during the academic year 1938-39.⁴⁴

Kinerson reported that about one-half of the 186 physical science teachers in public junior colleges he studied had done research at the master's level; however, only a small minority did research on the doctoral level.⁴⁵

Rainey's investigation of accounting teachers in Oklahoma revealed that 9 per cent of the four-year college and university accounting teachers conducted research, but no research was being carried on by junior college accounting teachers. The four-year college and university teachers completed 3 books, 25 articles, and 4 research projects compared to no book, 3 articles, and no research project for the junior college accounting teachers.⁴⁶

Pessen's study revealed that 11 members of his social studies department at Staten Island Community College, New York, during a four-year period published 33 articles, 3 books, 2 research projects, and completed 3 short stories. Additionally, four members of the staff were engaged in work on their doctoral dissertations.⁴⁷

Chapin and Vairo reported that during the past five years the 1,231 teachers in public four-year colleges in North Carolina have published a total of 1,374 articles, books, and textbooks, an average of 1.1 publications per teacher. The 135 teachers in public two-year colleges have published 24 articles, books, and textbooks, making an average of 0.2 publications per teacher.⁴⁸

Professional Organizations

Rainey found that only 11 per cent of the junior college accounting teachers in Oklahoma belonged to the American Accounting Association compared to 35 per cent of the four-year college and university accounting teachers. He also reported that 11 per cent of the junior college accounting teachers belonged to the American Institute of Certified Public Accountants by contrast with 39.5 per cent of the four-year college and university teachers.⁴⁹

⁴⁴Garrison, *op. cit.*, p. 36.

⁴⁵Kinerson, *op. cit.*, p. 114.

⁴⁶Rainey, *op. cit.*, pp. 209-211.

⁴⁷Pessen, *op. cit.*, p. 281.

⁴⁸Chapin and Vairo, *op. cit.*

⁴⁹Rainey, *op. cit.*, p. 210.

Chapin and Vairo found that the 135 teachers in public two-year colleges studied belonged to a total of 232 professional organizations for an average of 1.7 organizations per teacher. The 1,231 teachers in four-year colleges belonged to a total of 3,710 professional organizations for an average of 3 organizations per teacher.⁵⁰

Summary

The percentage of teachers in two-year colleges holding graduate degrees shows a steady increase since 1918. The median degree held by two-year college teachers is the master's degree, while approximately 10 per cent held doctor's degrees. There has been an overall decrease in the percentage of teachers having no degree.

Of the four-year college and university teachers approximately 40 per cent held doctor's degrees; however, according to the Research Division of the National Education Association, only about 25 per cent of the new teachers entering four-year colleges and universities held doctor's degrees in 1960-61.

In five different studies, McDowell, Koos, Martens, Kinerson, Summerer and Chares found that the number of years of experience for teachers in two-year and four-year colleges varied from 1-2 years to over 25 years experience. Medsker in his study reported that 64 per cent of the teachers in the two-year colleges had taught in secondary or elementary school, however, most of them on the secondary school level.

Koos reported that teachers in the two-year colleges completed more semester hours in professional courses in education than did teachers in the four-year colleges and universities.

According to the results disclosed in the investigations conducted by Garrison, Kinerson, Rainey, Chapin and Vairo the number of books and articles published by two-year and four-year college teachers was small; however, the four-year college teachers published in greater proportion. Furthermore, four-year college teachers were found to hold membership in more professional organizations than two-year college teachers.*

⁵⁰Chapin and Vairo, *op. cit.*

*The article is based on a doctoral dissertation completed at Duke University (1963), Durham, North Carolina.

A Study of the Second Year Female Academic Probates at Tuskegee Institute

by

Tommie M. Samkange

Throughout America, educational institutions are plagued with the drop-out problem. Studies have shown that even though the effects of this problem are more readily visible among the low socio-economic groups, a significant number of its victims are from the higher echelons of society. Further studies have indicated that it takes its toll among those with high scores on the intelligence tests as well as those with average and below average scores. Not only do its victims vary in abilities to succeed, but they also may be found at any point along a personality continuum. Such complexities combined with the increasing rate and intensity of the first drop-out figures have led many groups and individuals to delve into the problems in an effort to discover likenesses or differences in drop-out victims and to discover underlying causes for the apparent lack of holding power of educational institutions.

Statement of the Problem

The purpose of the present study was to discover the underlying factors which contributed to the failure of Tuskegee's 1964-65 second year probates. The researcher sought answers to such questions as (1) Were these students prepared for college work upon entrance? (2) How did they allocate their time between the social and academic realms of college life? (3) How much professional guidance did these students receive in choosing their majors and educational institution? (4) How did the academic areas compare in potential drop-out rate?

Need for the Study

In past years, Tuskegee Institute has suffered a loss of some 200 or more students per year who, because their level of academic performance was so low, were not allowed to continue their study at the Institute. Concurrently, some 500 or more students per year have been placed on academic probation due to a similar level of performance. Each of the afore-mentioned drop-outs represents over a thousand dollars and at least a year of time used to little or no advantage. Each case further represents a loss suffered by Tuskegee and society.

If adequate answers could be derived as the causes of such failures, preventive and remedial measures could be taken by Tusgee and other institutions suffering from the same problem.

Definition of Terms

Second year academic probate refers to those students who entered Tuskegee Institute in September, 1964 and whose averages at the end of the academic year were below the two-point requirement for freshmen at the end of the first year. It further includes Opportunity Work Plan students with less than two-point averages, who entered school prior to September, 1964 but who have maintained less than a two-point average and hence are still classified by the Institute as freshmen.

Potential drop-out designates those students who are treading on thin academic grounds. They are so designated because students who are on academic probation are believed by the author to be those persons who most often eventually become drop-out statistics.

Hypotheses

The author began this study on the assumption that many students find themselves on college probation and drop lists because (1) they come to college ill prepared to do college work; (2) they have had little or no professional guidance in choosing their majors and/or the educational institutions they attend; (3) they devote too much time and energy to the social realm of college life and not enough to the academic phase; (4) their work obligations leave too little time in which to fulfill their academic requirements adequately.

Review of Related Literature

Numerous studies have been conducted in the area of school drop-outs. For all practical purposes, they can be divided into three main groups: (1) that group which deals with the student mortality rate at various institutions (2) that group which deals with the comparison of drop-outs or potential drop-outs with normal achievers and with those who remain in school (3) that group which deals with those factors which influence students to become student mortality figures.

Each study, in its own way, gives educators something further to work with in their efforts to increase the holding power of educational institutions. A brief review of a few of these studies would be invaluable to one seeking to gain insight into the drop-out problem. Such a review would be of further significance in placing the present study in its proper perspective.

Identification of Drop-Outs

In 1958 Marion E. Gardner (4) conducted a study in which he sought to determine whether one could predict the academic success of students in college by using personality trait ratings obtained

from high school. Utilizing a Normal Curve Rating Scale, Gardner rated 190 high school seniors on the traits of reliability, industry, cooperation, initiative, efficiency, and accuracy. Coefficients of correlation were calculated between the average ratings on each trait and the quality point averages earned during the first year in college. These calculations revealed a significant correlation between the ratings on all traits and quality point averages. Calculated coefficients ranged from a high of .664 to a low of .335. Correlations involving the trait of accuracy were high enough for Gardner to suggest the use of this trait alone by colleges to supply significant information concerning applicants for admission.

An effort was made by Edward Jones (8) to study the academic probate from the standpoint of environmental and emotional personal factors and methods of study in order to find out how the factors contribute heavily to his academic status. A group of 35 male probates and a matched sample were subjected to the same check list of methods of study and information concerning the environmental situations. The results were not conclusive, but certain trends were evident. The abler students used a variety of methods of study. Their greatest superiority was in the area of preparing for examinations and in studying the texts. The better students were worriers and integrators. A sense of urgency characterized their efforts. Eighty per cent of the probates were affected by a lack of good study habits or a lack of motivations.

Student personal data records and other records were used in the study; ability and achievement test scores were analyzed; and generalizations were drawn for all students who entered school the fall semester of 1955 and were not enrolled for the fall semester of 1956. Thirty-six per cent of the drop-outs were earning passing grades when they withdrew and 64 per cent were not. Three of every five drop-outs scored in the lowest quartile on the English achievement test. Seventy-four per cent of the drop-outs scored below the national median on the English achievement test. One of every three drop-outs scored above average on the ability and achievement test and from five to eight per cent were academically capable of doing college work.

Nicholson (10) conducted a study in 1957 to analyze student mortality at State Teachers College, Indiana, Pennsylvania, with certain factors being regarded as selective admission and retention of students as a basis of improving services. Data for 2239 entering freshmen were collected on selected factors, developed into tables and interpreted. Eighty and seventy per cent of these students were in the upper half of their high school graduating class. Of this percentage 64.1 per cent graduated, whereas the graduation rate of those who were in the lower half of their classes was 39.5 per cent. The higher the student ranked on the ACE test or the better his first semester grades, the greater were his chances of survival. Students from large high schools survived better than those from small ones. Women were found to be better survivors than men.

Comparisons with Regard to Drop-outs

Drener (3) did a study in 1960 to discover any significant differences and similarities between over-achieving and under-achieving students. One hundred thirty-eight students (74 over-achievers and 64 under-achievers) were studied for differences in two major areas. The first area involved scholastic aptitude, cumulative grade point averages, reading abilities, mechanics of expression, high school marks, and age. The second area involved the average number of hours spent per week studying, in extracurricular activities, and in work for pay. The over-achieving students had better study habits, but there were no significant differences between over-achievers and under-achievers for all the areas of the vocational preference scale. For all other characteristics, there were very few significant differences.

Bernice Horall (6) conducted a study aimed at acquiring a better understanding of the performance and personality of brilliant college students, especially in terms of the ways in which they differ from college students of average or low college ability. College freshman scores on the ACE fell 1.5 or more sigmas above the mean when compared with matched cases from the middle of the distribution. A general information blank as well as the Group Rorschach Test and Group Thematics Apperception Tests were administered to the subjects. The experimental group was found to be significantly better in the following areas: fewer total "needs", fewer "needs" for achievement and recognition, better over-all adjustment, better effect of environment on organism, and better reaction to environment. They also had fewer conflicts about personal characteristics and about school performance. They over-emphasized small unusual details on the Group Rorschach. They also displayed a higher level of maturity and less deep underlying anxiety.

Influences on Drop-outs

A study to investigate experimentally some of the many factors known to be culturally determined and which influence the performance of persons in academics and on intelligence tests was undertaken by Ernest Haggard (5) in 1954. A total of 208 persons were subdivided into 24 sub-groups for the purpose of testing and retesting under various controlled conditions. Practice helped the high status group but not the low status group. Motivation during practice sessions had a negative influence on both groups. Both groups made significant gains on the test which was revised to remove middle class bias. Given test-retest conditions, the performance of low status persons improved substantially, whereas that of the higher status group remained relatively constant.

Oscar Christensen (1) did research in 1963 to explore the influence of a pilot summer advisory and counseling program for entering freshmen at the University of Oregon. When the experimental group was compared with the control group, it was found

that such a program was effective in the following areas: (1) increasing study program stability, (2) creating an immediate positive opinion about the value of organized orientation activities and about the counseling center. (3) creating an immediate positive reaction toward the University. It had no effect on elevating fall grades, some aspects of social adjustment, or improving persistence in college.

A study was conducted by Mahone (9) to test the theory which states that persons who are fearful of failure tend to be unrealistic in their vocational choices with respect to both ability and interest. He used the Mandleer-Sarason Test Anxiety Scale, Thematic Apperception stories, and a vocational information questionnaire. On each criterion of realistic vs unrealistic vocational aspiration, significantly more subjects who were low in achievement-related anxiety were classified as unrealistic than subjects who were high in achievement motivation and low in achievement related-anxiety. Sixty-eight were inaccurate and 66 were accurate in estimating their own abilities.

In his study, Slater (11) aimed to increase the understanding of factors influencing and affecting student mortality. He grouped the freshmen males according to the fathers' occupations. A year later the University records were examined to compare the rate of persistence according to the fathers' occupations and the college in which each was enrolled. It was found that the value systems and experiences which characterize family units predispose the children favorable or unfavorably toward the academic aspects of their collegiate life. Persistence rates ranged from .44 to .58 when students were enrolled in colleges where their fathers were employed. For students in "strange" academic settings, persistence rates were .39 and below.

Another study of "Factors in College Persistence" was conducted by Ikenberry (7) whose aims were (1) to examine differences in cognitive and affective characteristics between students who withdraw from college and students who remain through the first year and (2) to study differences between collegiate withdrawals and enrollees when these groups were classified in terms of first year college achievement and sex. At the end of an academic year an inter-correlation matrix was formed and factor analyzed for a random sample of withdrawals and enrollees. Data were obtained from school records, aptitude and ability tests, as well as interest tests. Of the three discriminate functions found, above average groups were high on the intelligence function, while below average groups were low on this function.

Female groups were all above male groups on the cultural-sex function, and withdrawal groups were above enrolled groups on the social-background function.

Cook and Martinson (2) completed a study to discover whether varying amounts of such subjects as high school mathematics, physical science, and foreign language studied in high school were related to differences in grades earned in six major areas of liberal arts. Freshmen students for whom complete high school records were available

were divided into dichotomies on the basis of high school grades. The *t* test was used to test the significance of the difference in mean grade point averages in college and a difference was considered significant if it reached the five per cent level or beyond. Findings showed that good work in high school English gives an advantage to the student in college over the average high school English student. There was little relationship in other areas.

METHOD OF PROCEDURE

In September of 1963, 995 freshmen were enrolled in the several schools at Tuskegee Institute. By June of 1964, 233 of these students were dropped from the Institute because of their low level of academic performance; 314 were placed on academic probation because of a similar level of performance; and 448 were in good academic standing.

Questionnaires were sent to the eighty-five female students on academic probation who enrolled at the Institute for the fall semester. (Those students who failed to maintain two-point averages were either dropped or designated as probates, depending upon the degree of failure and the circumstances surrounding the failure.) In spite of several attempts to retrieve questionnaires, the maximum number to be returned was fifty-nine.

The responses made to each question by each probate were carefully analyzed, recorded, and used with other findings to draw generalizations. High school grade point averages for the fifty-nine probates were obtained and compared with their cumulative college grade point averages. Further generalizations were drawn from the utilization of entrance examination scores made by subjects on the School and College Ability Test. Graphs and tables were used to facilitate interpretation of data.

FINDINGS

The use of Institute records such as high school grade point averages, entrance examination scores, and college grade point averages and the analysis of responses on questionnaires sent to the fifty-nine academic probates participating in this study did much to support and refute certain hypotheses set forth at the beginning of the research.

Academic Capability of Students

The first hypothesis stated that many students find themselves on college probation and drop lists because they come to college ill-prepared to do college work. Figure 1. shows the distribution of high school grade point averages for the fifty-nine students used in this study. These averages range from 1.41 to 3.93 on a four-point scale wherein "A" is four points, "B" is three points, "C" is two

points, and "D" is one point. In this distribution, the mean grade point average is 2.80 and the modal average is 3.51. Twenty-three students, or thirty eight per cent, had high school averages of "B" or above; sixty-seven per cent had "C" averages; and ten per cent had averages of "D".

According to information in Tuskegee's 1964-65 *General Information Bulletin*, students from accredited high schools with grade point averages of "C" or above may be admitted to the Institute unconditionally. It appears that this is the grade point average at which Tuskegee administrators feel that students are prepared to do college work. If this is true, the high school grade point index, which states that ninety per cent of the female academic probates studied were "prepared" to do college work, refutes the first hypothesis.

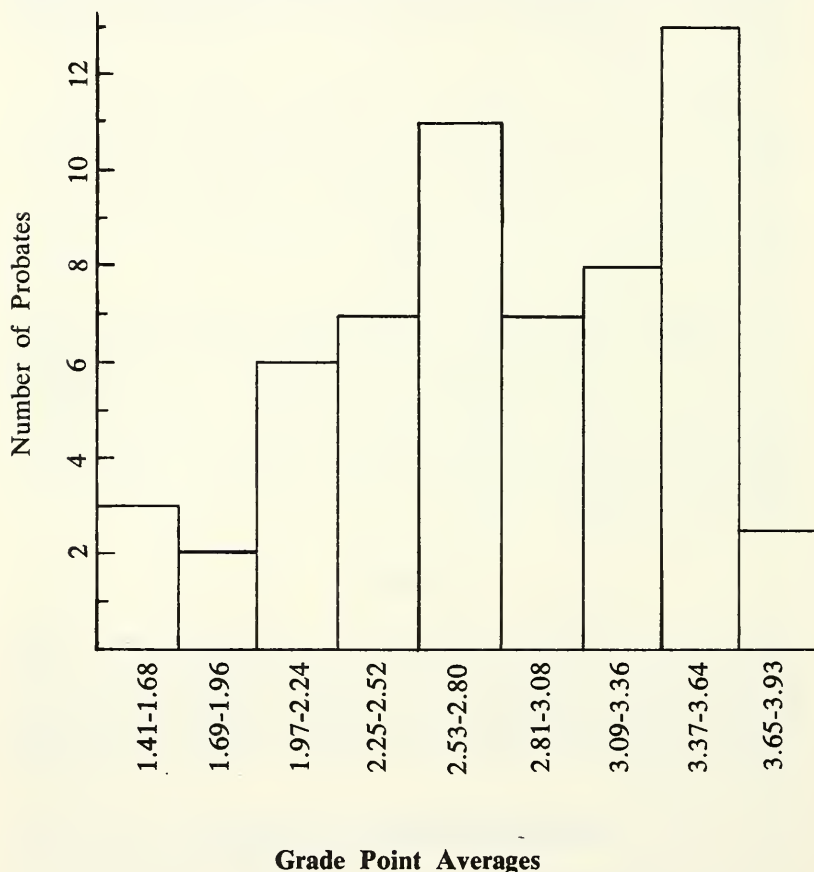


Figure 1. High School Grade Point Averages for Fifty-nine Academic Probates.

Figure 2. shows the distribution of total stanine scores for the Verbal and Quantitative aspects of the School and College Ability Test (SCAT) administered to each probate upon entrance. The figure shows a stanine class range from a low of three to a high of eight. Seventy-six per cent of the probates fell within the average stanine classes of four, five, and six; ten per cent fell in the below-average classes of three; and fourteen per cent fell into the above-average classes of seven and eight. The mean stanine score is 4.96 and the modal class is five.

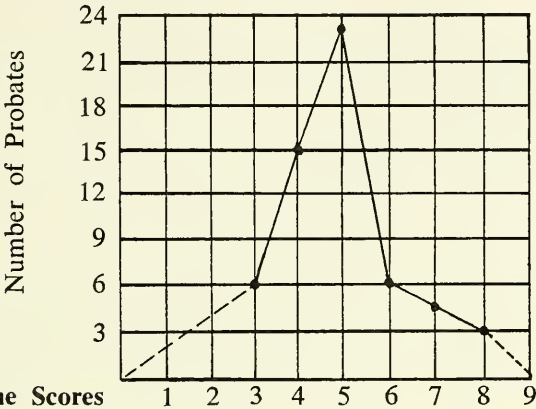


Figure 2. Stanine Scores for Fifty-nine Academic Probates.

Evidences pointed out by the two instruments discussed thus far harmoniously refute the first hypothesis. Indications are that sixty-six and five tenths per cent of the probates were capable of doing at least average college work.

Figure 3. indicates the rank of academic probates in their high school graduating classes. It shows that seventy-one and two tenths per cent of the probates were ranked in the upper fourth of their class; that fifteen and three tenths per cent were ranked in the upper middle fourth; that eight and five tenths per cent were ranked in the lower middle fourth of their class; and that five per cent were ranked in the lower fourth of their class. These indications go hand-in-hand with those presented in Figures 1 and 2. The class sizes ranged from 12-452.

Upper 25%	71.2% of the academic probates
Upper middle 25%	15.3% of the academic probates
Lower middle 25%	8.5% of the academic probates
Lower 25%	5% of the academic probates

Figure 3. Rank of Probates in High School Graduating Class.

Actual College Performance

A distribution of the college grade point averages of the fifty-nine probates as of June, 1964 is presented in Figure 4. The required grade point average for freshmen at the end of the first year is two points. The distribution shows a modal grade point average of 1.40 and a mean average of 1.62.

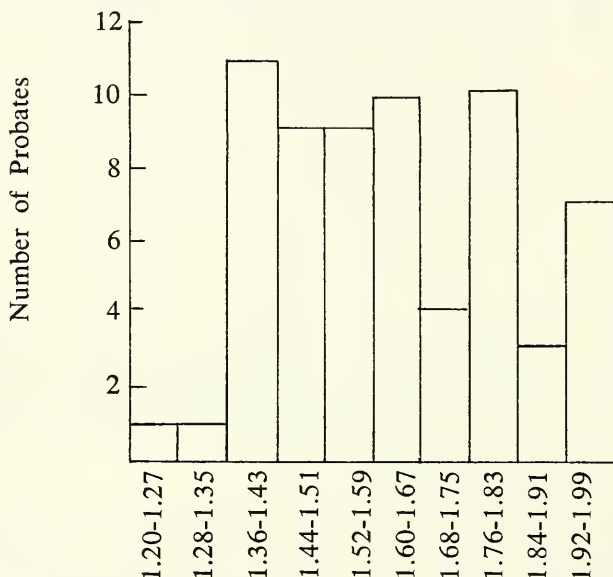


Figure 4. Distribution of College Grade Point Averages of Fifty-nine Academic Probates.

If the evidences pointed out in the three previous figures are correct, if sixty-six per cent of these students are capable of doing average college work, and if Figure 4 indicates that they are performing below their indicated abilities, what are the possible influences on their academic performance?

Professional Guidance

The second hypothesis in this study is that students find themselves on college probation and drop lists because they have had little or no professional guidance in choosing their majors and educational institutions. Table 1. describes the methods used by the probates in choosing their majors and educational institution.

Table 1. Reasons for Probates' Choice of Major and Educational Institution.

	Personal Interest	Counselor	High Grades in Major Area	Friends & Relatives
Major	39	3	2	15
Ed. Institution	11	12	0	36

Five per cent had professional help in choosing their majors; twenty-five per cent were actually assisted in making this choice by persons virtually unqualified to give such advice; and sixty-seven per cent chose majors purely on the basis of personal interest. Tuskegee was chosen by seven per cent with the aid of a counselor; by thirteen per cent with the help of instructors; and by sixty-one per cent with the help of relatives and friends.

Responses on the questionnaires (See appendix) further revealed that twenty-four per cent of the probates have changed their major while attending Tuskegee; that forty-two per cent of them experienced difficulty in the same area in high school as they did in college; and that thirty per cent of them were majoring in the area of their difficulty. This would further seem to indicate a lack of counseling or professional guidance.

In view of these students' feelings concerning their abilities, Figure 5 displays the reactions of probates to their 1963-1964 academic performance. These reactions appear to have some relevance to the guidance or lack of guidance received by probates prior to their enrollment at Tuskegee. Approximately forty-six per cent of them were greatly shocked at their performance as it related to their views of their abilities; approximately forty-one per cent were moderately shocked; and approximately fourteen per cent were slightly shocked. These responses indicate either a lack of understanding of themselves and their abilities, or a lack of understanding and preparation (in some area) for college. Thus, the second hypothesis is supported by the evidence revealed in Table 1. and Figure 5.

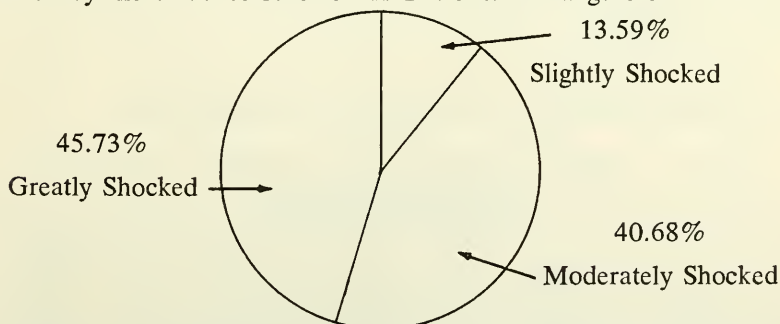


Figure 5. Reaction of Fifty-nine Probates to Their Level of Academic Performance.

Influences on Academic Performance

The third and fourth hypotheses formulated by the researcher were that many students find themselves on college probation and drop lists because they devote too much time and energy to the social realm of college life and too little to the academic phase; and their work obligations leave too little time in which to adequately fulfill their academic requirements.

Figure 6. displays the areas indicated by the probates to have been influences on their academic performance. Contrary to the stated hypotheses, work was listed as an influence by only five per cent of the students and extra-curricular activities by only eight and five tenths per cent.

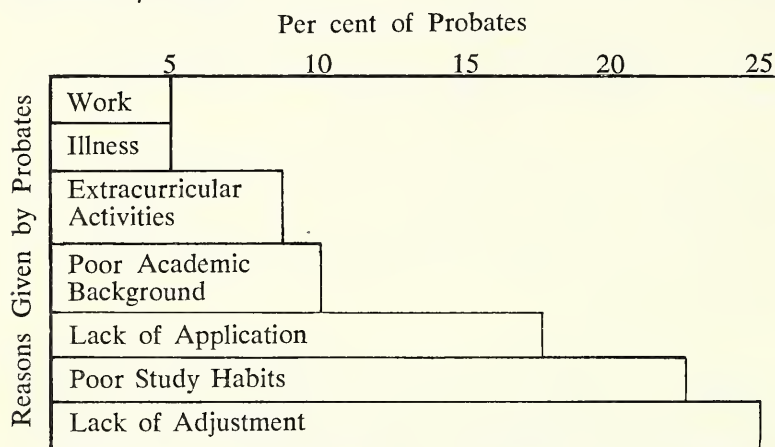


Figure 6. Reasons Given by Probates for Poor Academic Performance.

The major influences were lack of adjustment, which was reported by twenty-eight and eight tenths per cent; lack of application, which was reported by eighteen and six tenths per cent; poor study habits, reported by twenty-three and seven tenths per cent; and poor academic backgrounds, which was reported by ten and four tenths per cent of the subjects.

Table 2. shows how many extracurricular activities were engaged in by subjects last year as compared to the current year.

Table 2. Number of Extracurricular Activities Participated in by Fifty-nine Probates.

	None	One	Two	Three or More
Last Year	49%	23.7%	22%	5%
This Year	45.7%	31%	18.6%	5%

Approximately forty-nine per cent belonged to virtually no organizations last year and approximately forty-six per cent belong to none this year; approximately twenty-four per cent belonged to one organization last year and about thirty-one per cent belong to one this year; about twenty-two per cent belonged to two organizations last year as compared to nineteen per cent this year; five per cent affiliated with three or more organizations last year and the same percentage affiliates with three or more organizations this year. Since approximately seventy-three per cent of the probates belonged to no more than one organization last year, it can hardly be concluded that extra-curricular activities had a negative influence on the academic performance of the probates; thus, the third and fourth hypotheses were refuted by the study.

Other Findings

Figure 7. reveals the responses of probates concerning their performances this year as it relates to last year. Approximately eighty-eight per cent of the subjects feel that their performance has improved over that of last year; ten per cent feel that they are performing at about the same level; and about two per cent reported that their performance level seems to be lower than it was last year.

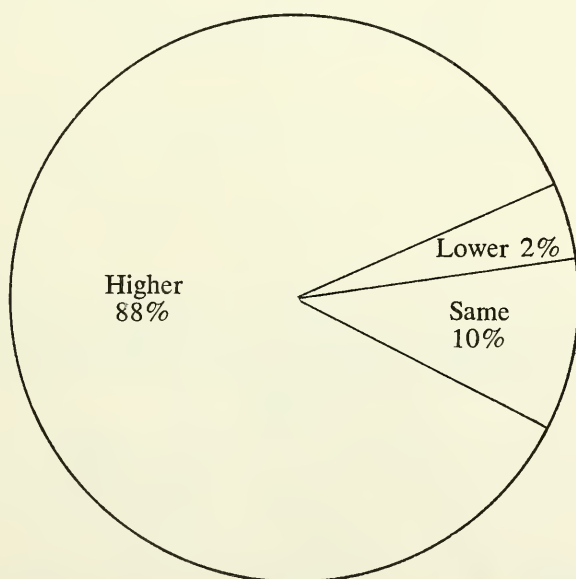


Figure 7. Probates' Performance as It Relates to that of Last Year.

Table 3. indicates that approximately thirty-seven per cent of the probates' fathers are engaged in unskilled work, while twelve per cent are engaged in professional work; that approximately sixty-eight per cent of the mothers are engaged in unskilled work, and about fourteen per cent are in professional work.

Table 3. Occupations of Probates' Parents.

	Father	Mother
Professional	7	8
Skilled	6	0
Semi-skilled	7	5
Unskilled	22	40
No response	7	2
Deceased	10	4
Total	59	59

Figure 8. reveals that probates come from family sizes ranging from one to eleven children. The model family size is four and the average number of children is five.

Figure 9. reviews the sources of financial assistance used by the probates. Nearly sixty-nine per cent depend upon parents alone for financial assistance; approximately twenty-two per cent depend on earnings from work; and approximately seven per cent depend on other relatives.

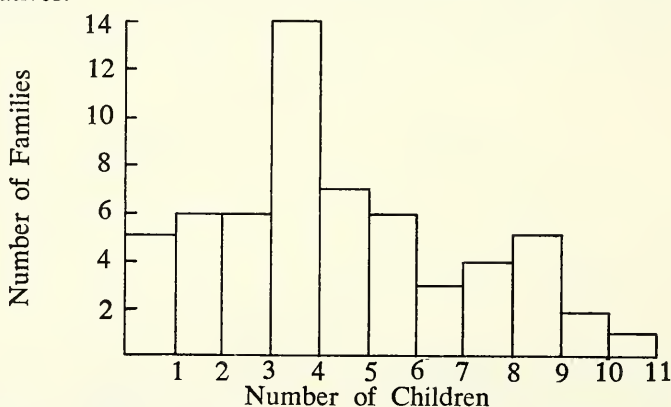


Figure 8. Number of Children in the Families of Fifty-nine Probates.

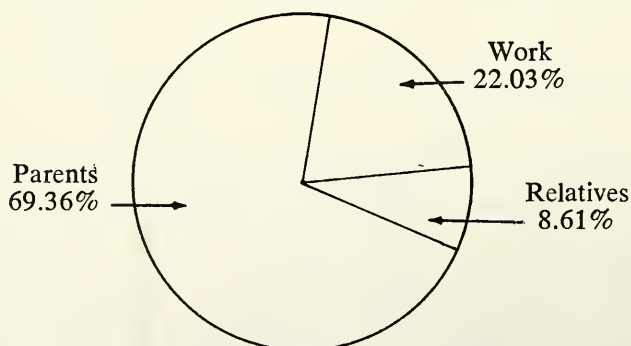


Figure 9. Sources of Financial Assistance for Fifty-nine Probates.

A distribution of probates according to majors may be viewed in Figure 10. The pattern ranges from a high of thirty-one per cent. in Education and twenty-five per cent in Arts and Sciences to a low of approximately seven per cent in both Mechanical Industries and Physical Education. These percentages have more significance when viewed in knowledge of the fact that Mechanical Industries and Physical Education combined have a population which is fifteen

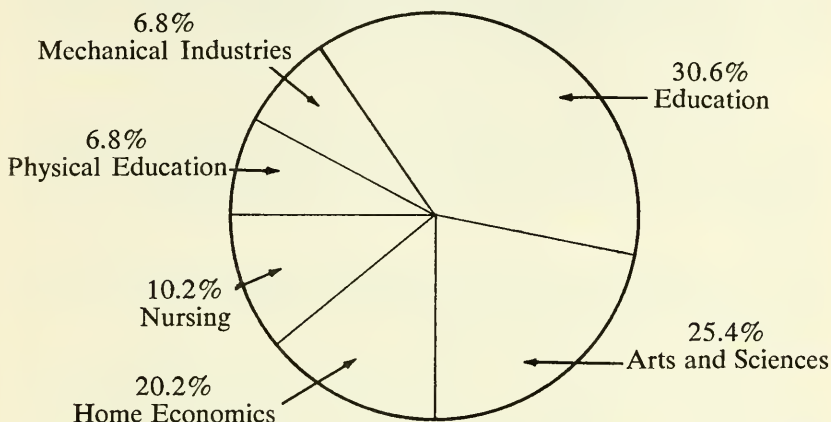


Figure 10. Comparison of Potential Drop-out Rate of the Several Schools Enrolled in by Probates.

per cent of the whole; whereas Arts and Sciences and Education combined have a population which is approximately forty-nine per cent of the whole, which was 2386 as of June, 1964.

Summary

The purpose of this study was to discover the underlying factors contributing to the failure of Tuskegee's 1964-65 academic probates. The author began the study with the following hypotheses: (1) Many students find themselves on college probation and drop lists because they come ill-prepared, (2) because they have had little or no professional guidance in choosing their majors and educational institutions, (3) because they devote too much time and energy to the social realm of college life and too little to the academic phase, and (4) because their work obligations leave them too little time in which to adequately fulfill their academic requirements.

The study involved the use of fifty-nine second year students who are currently on academic probation. High school grade point averages, college entrance examination scores, and college grade point averages were utilized along with questionnaires to provide pertinent data.

According to Tuskegee's "definition of preparedness," the first hypothesis was negated: ninety per cent of the subjects were "pre-

pared" to do college work because they had the required grade point for unconditional entrance to Tuskegee; ninety per cent fell within the average or above average stanine classes for the School and College Ability Test; and eighty-six per cent were in the upper half of their graduating classes.

The second hypothesis was supported by the study because only five and seven per cents respectively had professional help in choosing their majors and educational institutions, and because of the number of students who are having their greatest difficulty in the area of their major.

The third and fourth hypotheses were refuted by the study because it was found that work was listed as an influence on poor performance by only five per cent of the students, and extra-curricular activities was listed by only eight and five tenths per cent of the subjects.

Lack of adjustment and poor study habits along with poor academic backgrounds were given precedence by subjects as being areas of influence on their performance.

Other interesting findings indicate that (1) eighty-eight per cent of the subjects feel that they are doing better work this year than they did last year; (2) thirty-seven per cent of the probates' fathers are engaged in unskilled work as are sixty-eight per cent of the mothers; that twelve per cent of the fathers are engaged in professional work as are fourteen per cent of the mothers; (3) the family sizes of probates ranged from one to eleven children and that the modal and average family sizes respectively are four and five; (4) sixty-nine per cent of the probates receive their financial assistance from parents, twenty-two per cent from work, and seven per cent from relatives; and (5) the Department of Education has the highest potential drop-out rate while Physical Education has the lowest (using the majors of the probates as indices).

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Appendix
Questionnaire

Name _____

Age _____ Date of Birth _____ Sex: M _____ F _____ Major _____

1. What is your father's occupation? _____
2. What is your mother's occupation? _____
3. How many sisters do you have? _____
4. How many brothers do you have? _____
5. What is your main source of financial assistance for your college expenses? (____Parents), (____Scholarship), (____Federal Loan), (____Campus Work), (Specify Other _____)
6. Do you utilize any of the other sources to supplement your main source? Yes _____ No _____
7. If the answer to question # 6 is yes, name the sources _____

8. If you entered Tuskegee on a scholarship, from what organization or institution did it come _____; how much was the scholarship grant per semester _____?
9. Approximately how many students were in your graduating class? _____
10. Approximately what was your rank in your graduating class? _____

11. In what subject matter area did you have your greatest difficulty at Tuskegee Institute? _____
12. Did you experience difficulty in this general area in high school? Yes _____ No _____
13. Have you changed your major since you have been here? Yes _____ No _____
14. If the answer to question #13 is yes, what was your major before you changed it? _____
15. Who and or what was instrumental in your choice of a major? _____

16. Who or what influenced you to come to Tuskegee?.....
.....
17. Do you like it here? Yes..... No.....
18. Would you like to change schools? ____Yes ____No
19. If your answer to question #18 is yes, what school would you like to attend?..... Why?.....
.....
20. Was Tuskegee your first (___), second (___), or third (___) choice as an educational institution?
21. With what organizations did you affiliate last year?.....
.....
22. With what organizations do you affiliate now?.....
.....
23. Which of the following best describes your participation in areas of college life other than academic? (___ not involved enough), (___ involved enough), or (___ involved too much)
24. How do you feel Tuskegee could have or should have better helped you to improve your academic performance last year?
.....
.....
25. Judging from your perception of your abilities, which of the following best describes your feelings concerning your level of performance during the past year? (____ slightly shocked), (____moderately shocked), (____greatly shocked)
26. Which of the following best describes your level of academic performance this year as it compares to last year? (___ about the same), (___lower (____higher)
27. What factors do you attribute to this change or lack of change?
.....
28. What do you think were the causes of your low level of academic performance last year?
.....

Experimental Studies Exploring the Effectiveness of the Group Method in Counseling

by

Philip D. Vairo
and
Sheldon Marcus

Hoppock,¹ a leading student of occupational information, points out that the group technique has been considered by many educators less important and less effective than individual counseling. He challenged this concept as an absurd hypothesis and advocated that the group method, not individual counseling, be considered the indispensable part of the guidance program.

This article summarizes nine experiments in which the value of the group method as a technique for disseminating occupational information was explored. Conflicting results from different studies indicate encouraging success in some cases and failure in others. Apparently the success or failure of disseminating occupational information depends upon many factors about which the writers of this article can only speculate. The experiments are arranged according to school level.

Secondary School Level

Bruch² compared four classes of tenth-grade pupils at Abraham High School in San Jose, California, using one as a control group during the experimental period. No occupational information was presented to this group. A second group divided its time between activities geared toward acquiring occupational information and taking interest and abilities tests. A third group spent all of its time studying occupational information. The last group spent most of its time taking a battery of tests and devoted very little time to occupational information *per se*.

Bruch found that the pupils in the experimental groups acquired more understanding of the world of work and the advantages offered by particular occupations than the pupils in the control group.

¹Robert Hoppock, "Current Concepts and Status of Group Guidance in Secondary School," Paper read before the Guidance and Counseling Training Institute, University of Missouri, June 29, 1961, p. 1. (Mimeographed)

²Barbara Bruch, "Vocational Plans as Influenced by Three Experimental Guidance Procedures," *Abstracts of Dissertations*, Stanford University (1951), 16.

The experimental group spending all its time studying occupational information acquired the most occupational information. On the other hand, the group spending its time taking a battery of tests acquired the least information about occupations among the three experimental groups.

Cuony³ undertook to determine whether or not the group method of disseminating occupational information would produce an amelioration of an individual's earning power and job satisfaction. He taught a course, Job Finding and Job Orientation, to an experimental group of high school seniors. He compared the experimental group with an equated control group not given occupational information, in terms of job satisfaction and earning power.

The combined annual earnings of the experimental group exceeded those of the control group by \$7,719.00. Job satisfaction was found to be more prevalent among the members of the experimental group than those of the control group. There was less unemployment among the pupils in the experimental group than those in the control group.

Four years later after the first study was made, Cuony⁴ again compared the same experimental group and control group used in his first experiment. The average pupil in the experimental group was earning \$3,105.00 per year, while the pupil in the control group was averaging \$2,614.00 per year. The combined earnings of the experimental group exceeded those of the control group for the same year of \$14,226.00. The entire cost of the course to the school was \$1,542.00.

Dobberstein's⁵ experiment involved three groups of equated eighth-grade boys and girls, each consisting of 50 pupils. Two groups were exposed to occupational information. No occupational information was presented to the third group. Before and after the experiment all the pupils took tests on occupational information. The two experimental groups showed significantly greater gains than the control group.

Jessup⁶ taught a 10-week unit on occupations to a ninth-grade class. The objective of the course was to impart occupational information that would be helpful to the pupils in choosing vocations. After completion of the course, a test based upon material covered in the unit was given to all the pupils in the class. Jessup also gave the test to an eighth-grade class which had not received any occu-

³Edward Cuony and Robert Hoppock, "Job Course Pays Off," *Personnel and Guidance Journal*, XXXII (March, 1954), 389.

⁴Edward Cuony and Robert Hoppock, "Job Course Pays Off Again," *Personnel and Guidance Journal*, XXXVI (October, 1957), 116.

⁵W. P. Dobberstein, "A Study of Two Methods of Occupational Orientation for Junior High School Pupils," *Dissertation Abstracts*, University Microfilms, Ann Arbor, Michigan, XIII (1953), p. 1086.

⁶Robert Hoppock, *Group Guidance Principles, Techniques, and Evaluation* (New York: McGraw-Hill Book Co., 1949), p. 190.

pational information. From the results of the tests, Jessup concluded that a course in occupations does not impart enough occupational information to justify itself at the ninth-grade level.

Kutner⁷ conducted an experiment with two successive graduating classes at Paterson Technical and Vocational High School in New Jersey. The January class of 47 pupils was divided into an experimental and control group, and the June graduating class of 73 pupils was similarly divided. The January experimental group was taken on 10 occupational field trips and the June group was taken on 8 occupational field trips. The control groups did not go on any occupational field trips.

The experiment was followed up a year later using the following criteria: (1) employer ratings, (2) weekly wages, (3) job satisfaction. Kutner found that there were no significant differences in the experimental and control groups according to the criteria.

College Level

Lowenstein⁸ attempted to discover the effects of an occupations course taken by students in high school on their adjustment to college during their first year. He found that a higher percentage of the students in the experimental group said they based their occupational selection on interviews with people in their chosen profession. Second, the experimental group chose a wider variety of occupational fields than the control group. A smaller percent of the experimental group indicated that they were influenced in making their career selection by their parents or close relatives.

Hoyt⁹ organized three groups of twenty male freshmen each at the University of Minnesota. Each student was individually assigned by a random method to one of the three groups. The first group received vocational counseling on an individual basis; the second group participated in the group program; and the control group was not exposed to either of the two programs.

All sixty of the students indicated their tentative occupational choice, how certain each was of it, and how satisfied each was with his choice before and after the experimental duration. He concluded from these samplings that both the individual and group methods were effective in producing positive changes in occupational choice.

⁷J. E. Kutner, "An Evaluation of Occupational Field Trips Conducted by Paterson Technical and Vocational High School in Terms of Vocational Success," *Dissertation Abstracts*, University Microfilms, Ann Arbor, Michigan, XIII (1958), p. 2030.

⁸Norman Lowenstein and Robert Hoppock, "High School Occupations Course Helps Students Adjust to College," *Personnel and Guidance Journal*, XXXIV (September, 1955), 21.

⁹D. P. Hoyt, "An Evaluation of Group and Individual Procedures in Vocational Education," *Journal of Applied Psychology* (February, 1955), 26-30.

Miller¹⁰ divided Fairleigh Dickinson freshmen into three equated groups of 33 each. With two groups Miller used the group method to disseminate occupational information. He left the third group without instruction as to occupational information. Before and after the experiment, all the participants took an occupational information test. The test results revealed significantly greater gains in learning about occupational information for the experimental groups.

At the University of Minnesota, Stone¹¹ found that a course in occupational information decreased the number of students who were judged by their counselor to have made poor occupational choices in relation to their abilities. In addition, he found that a course in occupational information plus individual counseling decidedly helped improve their social adjustment.

Summary

The purpose of this article has been to investigate the effectiveness of the group method as a means of disseminating occupational information. This has been attempted through a careful reading of experiments dealing with the group method as a technique of disseminating occupational information. Nine experiments were studied in this investigation. Seven experiments, in varying degrees, corroborated the effectiveness of the group method as a means of imparting occupational information; two did not corroborate the effectiveness of the group technique. Six of the experiments studied were conducted on the secondary school level and three on the college level.

Recommendations

This investigation revealed several areas where further study is needed. The first of these is the need for study of the group method as a technique for disseminating occupational information. Second, is the group method more or less effective than individual counseling? Third, this study has led to another important question to be considered: Which are the most effective activities that will best promote learning occupational information through the group method? Several additional problems that have also suggested themselves as a result of this research are:

1. When should a course in occupations be taught?
2. What material should a course in occupations include?
3. Who should teach a course in occupations?
4. Should a course in occupations be required in high school?
In college?

¹⁰R. A. Miller, "Teaching Occupations Using Films and Field Trips," *Personnel and Guidance Journal*, XXXI (March, 1953), 373-375.

¹¹C. H. Stone, "Are Vocational Courses Worth Their Salt?" *Educational and Psychological Measurement*, VIII (Summer, 1948), 161-180.

Thermodynamic Parameters Behind Three Dimensional Shock Wave

by

Nazir A. Warsi

1. INTRODUCTION.

The author has determined the flow parameters behind three dimensional shock wave using Lagrangian Coordinate System [1]. The object of this paper is to study the thermodynamic parameters using the same techniques.

2. THERMODYNAMIC PARAMETERS.

We have the following theorems.

THEOREM 2.1: *The sound velocities of the fluid, behind and in front of the shock surface, are related by the equation*

$$(2.1) a \quad [c^2] = -\frac{\gamma-1}{2} \delta z_1 (\delta z_1 + 2) \frac{h_1^2}{\tau_1} \tau_1 /$$

or

$$(2.1) b \quad [c^2] = -\frac{\gamma-1}{2} \delta z_1 (\delta z_1 + 2) V_1 n_1^2$$

which, for the stationary shock, reduces to

$$(2.2) \quad [c^2] = -\frac{\gamma-1}{2} \delta z_1 (\delta z_1 + 2) u_1 n_1^2$$

PROOF: The sound velocities in two regions are related by

$$(2.3) \quad [c^2] = \gamma [p \tau]$$

The pressure and specific volume behind the shock surface are given by [1]

$$(2.4) \quad \delta z_1 = [z] / \tau_1$$

and

$$(2.5) \quad [p] = -\frac{h_1^2}{\tau_1} \delta z_1 \tau_1 /$$

Substituting the value of δz_1 and $[p]$ from (2.4) and (2.5) in (2.3), we get (2.1) a which, in consequence of the relation $-\frac{h_1^2}{\tau_1} \tau_1 = V_1 n_1^2$ gives (2.1) b. For stationary shock $V_1 n_1 = u_1 n_1$. Hence, we get (2.2).

THEOREM 2.2: *The Mach number behind the shock surface is given by*

$$(2.6) a \quad M_{2n_1} = \frac{u_{1n_1} - \delta z_1 \frac{h_1}{\tau_1} \tau_1}{\sqrt{c_{1n_1}^2 - \frac{\gamma-1}{2} \delta z_1 (\delta z_1 + 2) \frac{h_1^2}{\tau_1^2}}}$$

or

$$(2.6) b \quad M_{2n_1} = \sqrt{\frac{\frac{u_{1n_1} - \delta z_1 \frac{h_1}{\tau_1} \tau_1}{\tau_1}}{\frac{2 \rho_{1n_1} - (\gamma-1) \delta z_1 (\delta z_1 + 2) \frac{h_1^2}{\tau_1^2}}{2 \rho_{1n_1}}}}$$

or

$$(2.6) c \quad M_{2n_1} = \frac{u_{1n_1} + \delta z_1 \frac{V_1 n_1}{\tau_1}}{\sqrt{c_{1n_1}^2 - \frac{\gamma-1}{2} \delta z_1 (\delta z_1 + 2) V_1 n_1^2}}$$

PROOF: From the definition of Mach number, we have

$$(2.7) M_{2n/} = u_{2n/} / c_{2/}$$

Also, the velocity behind the shock is given by [1]

$$(2.8) [u_{n/}] = -h'_{n/} \delta \varepsilon / \tau_{1/}$$

If we substitute the value of $c_{2/}$, $u_{2n/}$ from (2.1)a, (2.8) in (2.7), we get (2.6)a which in turn gives (2.6)b in virtue of the relation $c_{1/} \tau_{1/} = \gamma b_{1/} \tau_{1/}$. Using the relation $-h'_{n/} \tau_{1/} = v_{2n/}$ and equation (2.6)a, we easily obtain (2.6)c.

THEOREM 2.3: *The components of obliquity behind the shock surface are given by*

$$(2.9) \Psi_{2/\alpha} = \frac{u_{1/i} x_{j\alpha}^i}{u_{1n/} - h'_{n/} \tau_{1/} \delta \varepsilon /}$$

PROOF: The components of obliquity in a region $\beta/$ is given by

$$(2.10) \Psi_{\beta/\alpha} = \frac{u_{\beta/i} x_{j\alpha}^i}{u_{\beta n/}}$$

whence, we have

$$(2.11) \Psi_{2/\alpha} = \frac{u_{2/i} x_{j\alpha}^i}{u_{2n/}}$$

Substituting for $u_{2/i}$ and $u_{2n/}$ and applying the fact that

$$(2.12) X_i X_{j\alpha}^i = 0,$$

we get (2.9).

THEOREM 2.4: *For a stationary shock wave, we have*

$$(2.13) \frac{1}{\delta \varepsilon /} + \frac{1}{\delta \Psi /} = 1$$

where $\delta \Psi /$ the obliquity strength of the shock wave is defined as

$$(2.14) [\Psi_{\alpha}] = \delta \Psi / \Psi_{1/\alpha}$$

PROOF: Since $-h'_{n/} \tau_{1/} = v_{2n/}$ and $v_{2n/} = u_{2n/}$ for a stationary shock, (2.9) can be written as

$$(2.15) \Psi_{2/\alpha} = \frac{u_{1/i} x_{j\alpha}^i}{u_{1n/} (1 + \delta \varepsilon /)}$$

Now, putting $\beta = 1$ in (2.10), we get

$$(2.16) \Psi_{1/\beta} = u_{1/i} x_{j\alpha}^i / u_{1n/}$$

This and (2.15) give

$$(2.17) \Psi_{2/\alpha} = \Psi_{1/\alpha} / (1 + \delta \varepsilon /)$$

which, with the help of (2.14), gives (2.13).

THEOREM 2.5: The obliquities behind and in front of the shock surface are related by the equation

$$(2.18) \left[\frac{1}{\psi_{\infty}} \right] = - \frac{h' n / \delta z / z_1 /}{u_{1/2} x_{2/2}}$$

PROOF: In consequence of (2.9) and (2.16), we get (2.18).

THEOREM 2.6: If e be the specific internal energy of a polytropic gas, then we have

$$(2.19) [e] = -\frac{1}{2r} \delta z / (\delta z / + 2) h' n^2 z_1^2$$

PROOF: For a polytropic gas, we have

$$(2.20) I_{\infty /} = e_{\infty /} + p_{\infty /} z_{\infty /}$$

whence, we get

$$(2.21)a [I] = [e] + [p z]$$

or

$$(2.21)b [I] = [e] + \frac{1}{r} [c^2]$$

But, $[I]$ is given by $[I]$

$$(2.22) [I] = -\frac{1}{2} h' n / \delta z / (\delta z / + 2) z_1^2$$

which, in consequence of (2.1)a and (2.21)b gives (2.19).

THEOREM 2.7: Specific entropies of a polytropic gas behind and in front of the shock surface are related by the equation

$$(2.23). [\eta] = J C_v \log \frac{(\delta z /)^{r-1}}{2 c_{1/}^2} \left\{ 2 c_{1/}^2 - (r-1) \delta z / (\delta z / + 2) h' n^2 z_1^2 \right\}$$

PROOF: For a polytropic gas [2], we have

$$(2.24)a \eta_{\infty /} = J C_v \log p_{\infty /} z_{\infty /}^r$$

or

$$(2.25)b \eta_{\infty /} = J C_v \log \frac{c_{\infty /}^2 z_{\infty /}^{r-1}}{r}$$

whence, we get

$$(2.26) [\eta] = J C_v \log \frac{c_{2/}^2}{c_{1/}^2} \left(\frac{z_{2/}}{z_{1/}} \right)^{r-1}$$

If we substitute the value of $\frac{c_{2/}^2}{c_{1/}^2}$ from (2.4) and $c_{2/}^2$ from (2.1)a in (2.26), we readily get (2.23).

THEOREM 2.8: The temperature of a polytropic gas behind and in front of a shock surface are related by the equation

$$(2.27) [T] = - \frac{(r-1)}{2rR} \delta z / (\delta z / + 2) h' n^2 z_1^2$$

PROOF: For a polytropic gas, the temperature in a region of the fluid is given by

$$(2.28) \quad C_{\infty}^2 = \gamma R T_{\infty}$$

which gives

$$(2.29) \quad [C^2] = \gamma R [T]$$

Equation (2.29), by virtue of (2.1)a becomes (2.27).

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Development Planning Under Democracy: The Case of India

by

Sarvan K. Bhatia

While science and technology are making rapid strides adding to the convenience and comforts of man at an alarming rate, and man's venture into outer space has achieved spectacular results, we find significantly large numbers of the human race still living in subhuman conditions and working much the same way as their ancestors did in the middle and medieval ages. In the last two hundred years, the economies of several countries of the world have been modernized and diversified through the imagination and initiative of their inhabitants. Such developments have enabled the people of those countries to enjoy a rising standard of living and a material well-being which was not envisaged earlier in the history of the world. Some nations have marched ahead of others and therefore have come to be recognized as the industrially advanced countries; others which lagged behind are thought of as economically underdeveloped or less developed areas. These countries, to be sure, are planning to seek the same kind of economic development¹ and modernization of their economies as is found in industrially developed nations. The development work is being undertaken with the avowed objective of raising the standard of living of the masses steeped in poverty for a considerably long time.

Though the development process undertaken by the less developed nations is more or less the same as was undertaken by the present-day developed countries, the time factor is of considerable importance. While it took the industrially developed nations about two hundred years to come to the modern jet and space age, governments and the people of underdeveloped countries are eager to modernize their stagnating and subsistence-agrarian economies in the shortest possible time; they are in a "state of revolt". And it is in this context that these countries have resorted to planning for accelerated development; the planned program designed essentially for the most effective, balanced and optimum utilization of scarce resources and channeling the flow of investable funds into priority industries with a view to stimulate development within the shortest possible time. Despite tremendous odds, the underdeveloped nations are engaged in a socio-economic revolution to achieve the desperately-needed economic growth. With the formulation of plans, the first step towards breaking with the "habit of inertia" has been taken; the immemorial

¹Economic development has been taken here in the context of progressive improvement in material well-being and extends to economic and social improvement of the inhabitants of a country.

passivity and fatalism have yielded to the desire for a better and materialistic way of living and a great upsurge for economic development all around is clearly visible. In respect to India, real and concerted efforts toward diversification of its static and chiefly agrarian economy on a planned and systematic basis started after the achievement of political freedom in 1947; the decade of 1950's stands out figuratively and significantly when two five-year plans were launched and successfully completed thereby setting in motion a series of five-year plans. After putting her First Plan in operation in 1951, India is now in the fourth year of her Third Plan.

The transition from tradition to modernity is necessarily a slow, time-consuming and intricate movement—more so, in its early stages. But as the methods of growth are learned and some of the steps towards modernization are completed, there emerges, out of this travail, new levels of prosperity and rising productivity. Despite numerous handicaps and appalling dilemmas, the state and the people of India are committed to, and are making strenuous efforts towards, such a transition. Though the process of development and modernization started over a hundred years ago—the decade of 1850's witnessed the successful establishment of the first phase of jute and cotton mills and other industries—unlike other countries coming to industrial “maturity” during the mid-nineteenth century, this did not mark the beginning of a diversified industrial growth; it was “both a beginning and an ending” as the MIT economist, Charles Myers, has remarked. On the other hand, while the foundations of modern industries were laid, the industrial sector “remained isolated from the bulk of the Indian economy. This economy and the archaic social system were left stagnating while the economy in Western nations was advancing rapidly.”² Two world wars did provide a great stimulus and the industrial base was broadened considerably compared with industrial production at the beginning of the twentieth century as evidenced by the growth of industrial employment, one of the prime indicators of industrial growth before automation. Thus total factory employment stood at 0.25 million in 1892, rose to nearly 1.2 million in 1919, and by 1939, the figure had jumped to 1.75 million. Before the First Plan was launched, industrial employment stood at 2.44 million.

But even this tremendous growth, significant as it was, did not go very far when we consider the fact that India on account of the large known reserves of natural resources, has considerable potential for industrial growth. To wit, India has extensive reserves of iron ore, manganese, bauxite, coal, mica, etc. Similarly, a large potential for hydro-electric power exists and electricity could be made available at very cheap rates. India's potential capacity to produce steel and other basic materials relatively cheaper and the large and growing domestic market, points out the Planning Commission, place India in a favorable position to produce machinery and a long range of engineering, chemical and electrical goods needed for accelerated

²*India, The Awakening Giant* (New York, 1957), p. 53.

economic growth. In 1953, the contribution of manufacturing sector to the gross national product was 16 per cent only taking the average for 1950-51; as late as 1958-59, primary products constituted nearly half of the GNP. The lag in exploitation of rich natural resources led to massive poverty on the one hand with ostentatious luxury spotted here and there. The two extremes go together to make India "a land of contrast" to the foreign observer.

Still taking into consideration the total volume of industrial production, India ranked the tenth largest producer of industrial output by 1950. However, considering the available resources and domestic market, industrial development did not take place at a rate whereby it could generate sufficient employment opportunities or provide a rising standard of living for India's growing populace. In the fifty years from the beginning of the twentieth century, a period when in every other developing country more and more people were finding jobs off the farms, the Planning Commission, points out that there was in India very little increase in the number of jobs in industry or in other non-agricultural occupations. In the United States, farm population shifted from 37 per cent of total working population in 1900 to 12 per cent in 1955 and declined to less than 10 per cent in early 1960's. On the other hand, nearly 70 per cent of the labor force was engaged in agriculture till 1950's in India; the manufacturing sector employed nearly 2.44 million workers out of the total population of 350 million by 1950. Thus only a small minority of Indian population which has been in direct contact with the industrialization process has been changed significantly in the mid-twentieth century despite the fact that the process of modernization started one hundred years ago: in the very shadow of steel mills, George Deasy points out, peasants plod behind the wooden plow of their ancestors. India's prime minister, the late Jawaharlal Nehru, once described India "as a bundle of the centuries in which the cow and the tractor march together." By far the largest part of Indian population still lives in rural areas, as is generally the case in less developed countries, and is dependent on subsistence agriculture; there are hundreds and thousands of villages containing scores of millions of peasants in which no perceptible improvements had taken place for many decades and generations—as late as 1940's. The irony is that in spite of 70 per cent of the population engaged in agricultural occupation, India is unable to grow sufficient food grains and has to depend on wheat and rice imports, mainly from the United States, to feed her millions. One of the gravest problems faced by India, therefore, is the raising of agricultural production. For almost twenty years now, India has been obliged to import food and grains worth millions of rupees every year, with few exceptions, and thereby to spend a considerable part of her valuable foreign exchange to meet food shortage.

After the attainment of political freedom in 1947, the national government was faced with ushering in an economic revolution in the nature of reviving the static Indian economy. During the freedom struggle, the political aspect of independence overshadowed

everything else. However, even during this period, some hard thinking on the measures to be undertaken to uplift and modernize the economy had been done. Therefore, after independence, the immediate problem was to strengthen the economy at the base and to provide certain essential social and economic overheads which would accelerate economic development and combat the curse of poverty. It was recognized that a comprehensive program of national planning was required to provide for integrated development of heavy and key industries, small-scale and cottage industries, agriculture and rural development, and the provision of social services. The need for building a technologically mature society and a social order which offer equal opportunities to all citizens was therefore given full recognition. The constitution of India drafted during 1947-49 accordingly embodied the Declaration of Fundamental Rights. These rights were stated in two parts. The first part provides that the state shall not discriminate against any citizen on the ground of religion, race, sex, etc., and emphasizes the principle of equality. The second part, which is more important from our point of view, comprises the Directive Principles of State Policy and provides among other things that:

The state shall strive to promote the welfare of the people by securing and protecting, as effectively as it may, a social order in which justice, social, economic and political, shall inform all the institutions of national life.

The Government of India set up the Planning Commission (of which a mention has been made above) in March 1950 with the avowed object of fulfilling this part of the Fundamental Rights whereby the state had taken upon itself the responsibility to guarantee certain long-term economic and social benefits to the people. The Planning Commission was charged with the duty of formulation of plans for rapid economic development. Its major terms of reference included (1) the assessment of material, capital and human resources, (2) formulation of a plan for the most effective and balanced utilization of these resources, (3) fixation of priorities for carrying out the plans, and (4) determination of conditions to be established for the successful execution of plans.

In releasing the draft First Five Year Plan, the Commission observed:

Planning in a democratic state is a social process in which, in some part, every citizen should have the opportunity to participate. To set the patterns of future development is a task of such magnitude and significance that it should embody the impact of public opinion and the needs of the community.

Thus planning in India has been a two-way process. It moves from the bottom to the top giving expression to ideas and ideals of common man, and from top to bottom carrying information and instruction from enlightened leadership to illiterate millions. At the same time, India welcomes the ideas, the experience and help of

other nations, but tries to find solution of pressing problems through its own national democratic traditions and beliefs. There is nothing dogmatic or doctrinaire in its planning. Within the two guideposts of social justice and peaceful democratic means, India has decided to remain flexible and pragmatic in achieving economic and social goals. In planning its development, the Planning Commission has observed, the democratic means which India as a parliamentary democracy has chosen are three: democratic persuasion to bring about participation and cooperation of all; democratic planning involving all groups, from the village to the national government, at all levels; and the use and strengthening of democratic institutions to administer and speed economic development.³

The opening paragraph of First Plan stated that the central objective of Indian planning was to initiate a process of development which will raise the living standards and open out to people new opportunities for a richer and more varied life. Agricultural development received the highest priority in First Plan. This was done with the twofold objective of increasing agricultural production so as to meet chronic food shortage, to prepare the future base for further sustained growth and industrialization and the great need to ameliorate economic lot of rural India—the hard core of India where 80 per cent of its inhabitants reside. Whereas there has been some improvement in the living standard of the city folks where industrial development has taken place, the conditions in villages have been fast deteriorating where agriculture is the prime occupation. There are several reasons for it: increasing pressure in the soil and low crop yields, non-availability of irrigation facilities and consequently dependence of crop yields on the vagaries of weather, to mention only a few. Because agriculture has long been dependent on the monsoons, it has rightly been called “a gamble in monsoon”. In order to provide a perennial source of irrigation with a view to put agricultural production on a sound and rational basis, it was paramount to extend irrigation; hence, the second precedence was accorded to irrigation. As a matter of fact, an integrated development of the land and water resources is of fundamental importance to Indian economy and the First Plan therefore gave top priority to agriculture and community development, irrigation and multi-purpose irrigation and power projects. The multi-purpose projects were designed with the object of providing irrigation facilities, flood control measures, and generation of electricity. By taming the rivers and harnessing their water potential, these multi-purpose projects are now not only a source of perennial and regular water supply thereby bringing a revolution in the rural economy of India but have also saved millions of people from flood-havoc which annually caused damage to life and property and washed away precious soil and crops. The irrigation potential of these projects, combined with medium and small projects, was 19 million acres during the First Plan.

³*The New India: Progress Through Democracy* (New York, 1958). p. 35.

The important targets set in First Plan were not only realized but even exceeded in some cases. There had, no doubt, been some serious shortfalls in certain sectors, but both agricultural and industrial production recorded substantial increases. With rising production and careful financial planning, inflationary pressures were checked. All this, however, was essentially in the nature of meeting the immediate needs and to initiate a process for more rapid advance in the future. To the extent First Plan evoked community participation and mass cooperation, achieved planned targets in various sectors without disturbing price stability, created confidence among the masses as "masters of their own destiny", and increased industrial production, it was a remarkable success. Furthermore, it strengthened the belief in democratic planning and showed beyond doubt that significant and substantial results could be achieved under democratic planning instead of resorting to a regimented system as has been done in various totalitarian societies.

In continuing further development of the approach set out in First Plan, the Second Five Year Plan was designed to lift the Indian economy and speed the rebirth of India as a modern nation. The principal objective was to secure a more rapid growth of national economy and to increase productive potential in a way that will make possible accelerated development in succeeding plan periods. Thus it sought to make the economy more dynamic in terms of economic and social ends by building up basic industries on the one hand, and the reorganization of rural economy on the other. The latter objective was designed to be achieved by completing agrarian reforms, community development and cooperative programs initiated in First Plan.

In this age when industry is the measure of a nation's progress, India, on account of various heterogeneous factors, remained indifferent to industrialization till the beginning of the Second World War. The Second Plan was the first concerted effort ever made toward industrialization of India. One of the prime requisites for successful industrialization is the manufacture of iron and steel. Therefore, one of the most significant achievements of Second Plan was the setting up of three iron and steel plants with an initial capacity of one million tons each, and a further provision of expansion to double their capacities in Third Plan. The first iron and steel plant was set up in India in 1911; by 1951, India produced 1.4 million tons of iron and steel only despite the fact that iron ore reserves amounted to three billion tons, nearly 75 per cent of U.S. deposits, with high iron content. With the establishment of three steel plants and increasing the capacity of three existing plants in Second Plan, India produced six million tons of ingot steel in 1963. Similarly, several machine-building and capital and producer goods industries which constitute the basis for any program of accelerated industrial growth, were taken up. India is now producing increasing quantities of machine tools and machinery for use in agriculture and transport, and for such industries as chemicals, textiles, jute, cement, etc. Significant progress has also been made by chemical industries, particularly pharmaceuticals, heavy chemicals and ferti-

lizers. Some idea of the striking developments in industrial sector can be obtained from the following indices of industrial production with 1950-51 as the base—

<i>Group</i>	<i>1955-56</i>	<i>1960-61</i>
General index	139	194
Cotton textiles	128	133
Iron and steel	122	238
Machinery—all types	192	503
Chemicals	179	288

While the gains of First Plan were encouraging and substantial in the limited sphere encompassed by it, its significant success led the way for further experimentation with bold determination. Thus the Second plan in further developing the approach of First Plan substantially increased industrial production by building basic and key industries and integrated it with balance growth of agricultural and small-scale industrial production. The rate of growth of national economy was accelerated; firm foundations were laid for broadening and expansion of industrial base together with a balanced agricultural and industrial development. Judging by the progress so far achieved by the metallurgical, mechanical and electrical engineering and chemical industries in augmenting industrial potential, and taking cognizance of the heavy machine-building projects undertaken in late 1950's, the Planning Commission has remarked that some of the basic conditions required for an accelerated growth towards the goal of a self-reliant economy have been successfully established.⁴

The Third Five Year Plan, undertaken in 1961, was designed to carry forward the tasks that were initiated in the first two plans. The principal aims of Third Plan, as in earlier plans, are (1) the securing of an increase in national income, (2) achievement of self-sufficiency in foodgrains and increasing agricultural production, (3) expansion of basic industries like steel, chemical, etc., (4) utilization of manpower resources to the fullest extent and ensuring a substantial expansion in employment opportunities, and (5) establishment of greater equality of opportunity and reduction of economic inequalities. Considerable emphasis has been placed on agricultural and community development and on the industrial sector with a view to achieve a balanced and integrated development. During the decade of 1950's the general index of industrial production had gone up to 194, with 1950-51 as the base, and the index of agricultural production for all crops had recorded a 35 per cent increase thereby bringing a cumulative rate of expansion of about 7 and 3.5 per cent per annum increase for industry and agriculture respectively. The planned programs brought about a substantial increase in the rate of investment in directions calculated to accelerate economic development. Thus total public and private investment increased from 5 billion rupees per annum at the beginning of First Plan in 1951 to 8.5 billion at its completion in 1956 and by 1960

⁴*Third Five Year Plan* (New Delhi, 1961), p. 39.

had gone up to 16 billion rupees per year (\$ 1 = Rs. 4.76). Total investment during the two plans, 1951-61, was 101 billion rupees—public and private sectors contributing 52 and 49 billion respectively. India had therefore witnessed the beginning of an industrial revolution during the past decade, and, viewing the industrial scene as a whole, points out the Planning Commission in Third Plan, independent expert opinion has borne testimony to the great progress achieved in quite a short space of time and has characterized the broadening of industrial base and the buoyancy of manufacturing enterprises as the “most striking change in the Indian economy.” Up to 1963, during twelve years of development planning in India, national income had gone up by 48 per cent and per capita income had increased by 20 per cent. It is expected that with the completion of Third Plan, the take-off stage as expounded by Rostow for development of economies from the less developed to advanced stages shall be nearer realization and from thereon, the Indian economy shall reach the self-sustaining growth stage.

While striking progress has been made to broaden the industrial base and to modernize the Indian economy since independence, and India has started manufacturing automobiles and jet aeroplanes, which shows the sophistication and wide range of Indian manufacturers, it must be recognized, as the Planning Commission has rightly pointed out, that this success, considerable though it is, has so far been insufficient to make any great impact on the general condition of the masses. There have been some large shortfalls in achieving the set industrial targets though considerable progress has been made in the industrial sector. India has still to achieve self-sufficiency in food and grains and to increase agricultural production to meet the needs of fast-growing population. One of the gravest problems facing India is therefore the rapid increase in population; total population increased from 357 million in 1951 to 438 million in 1961. This means that the living standard, which is already very low, will be considerably affected because not only an ever-increasing number of mouths has to be fed but it retards economic development also inasmuch as a considerable proportion of output from additional investment disappears in greater consumption by a growing number of consumers. Gainful employment is yet to be provided to millions of unemployed and underemployed. The problems of providing transport and communications, housing, sanitation, education and other social services have yet to be tackled. There is, therefore, no need to be complacent; much hard work yet remains to be done, and many sacrifices are required to be made. One can, however, take some genuine pleasure and satisfaction in the fact that India has started to move; that the means adopted are just and humane, and the face of India is changing surely though slowly and gradually.

In a way, development planning undertaken by India can be compared with the “planning” undertaken by Labor government in Britain during 1945-51. However, there is a considerable difference of degree though not of kind involved in the two cases. In regard to British planning, Schumpeter commented in his book, *Capitalism*,

Socialism and Democracy, published in 1950, that "most of the planning that has been actually done or suggested has nothing specifically socialist about it unless we adopt a definition of socialism that is much too wide to be of any analytic use." The Labor party had, however, in its election manifesto "Let Us Face the Future" definitely committed itself to a socialist program of nationalization of certain industries. Some of the industries had been nationalized by the Labor government also. Planning in India goes farther and much deeper than what was attempted in England during 1945-51, and yet in the light of Schumpeter's remarks, it is difficult to apply the term "administered capitalism" to Indian economy, as he did in respect to British economy, inasmuch as the state, through its Planning Commission, has issued the five year plans which are quite detailed in nature and encompass a considerable part of the Indian economy whereas there was no blue print available for the British economy. At the same time, India has not attempted to nationalize the industries; there have, no doubt, been four cases of nationalization so far, each for a special reason of its own, but no organized industry is involved. The nationalization has taken place in respect to life insurance companies, Indian airlines companies, Imperial Bank of India and the Kolar gold fields. The late prime minister Nehru referring to the doctrinaire socialists who urged nationalization of all Indian industries stated categorically in the Indian parliament in 1956 that the whole philosophy lying behind the Second Plan is to take advantage of every possible way of growth, and not by doing something which fits into some doctrinaire theory.

In this context it will be appropriate to recall the "socialist pattern of society" slogan which is the officially accepted and avowed objective of Indian economic policy. There has been some confusion and misunderstanding about the Indian goal of democratic socialism and the broad objectives of social and economic policies in terms of socialist pattern of society are not clearly understood. However, the term "socialism" is not interpreted in India in the same way as it is in the United States, and an average American feels very touchy by the very mention of the word socialism. India has always placed means above ends, as is truly borne out in its freedom struggle. Similarly, in bringing economic freedom to the masses and in changing the shape of rural India, where economic conditions have remained static for a long time and in a way mass poverty has been conserved, the means adopted have been purely and truly democratic. In describing the approach to development planning, the Second Plan pointed out that the socialist pattern of society is not to be regarded as some fixed or rigid pattern, and that the accent is on the attainment of positive goals, the raising of living standards, the enlargement of opportunities for all and the creation of a sense of partnership among all sections of the community. The ruling Congress party stated at its 1963 session held at Bhuvaneshwar that in enunciating the principle of socialist pattern of society "the object is to attain an economy of abundance in the country by the fullest and the most effective use of human and material resources Everyone should have equal opportunity and a just share in

the fruits of progress. . . . This change has to be achieved by peaceful means and with the consent of the people while preserving and fostering the democratic methods of values as enshrined in the constitution of India. The Congress ideology may thus be summed up as democratic socialism based on democracy, dignity of the human individual and social justice."

At the end of the article, it would be significant to recall an important aspect of development planning in India, and to put it in the words of planners as stated in the First Plan:

Although the task of drawing up a plan of development has been, in some measure, concluded, we are conscious that planning is a continuing process and from time to time adjustments in policy and program will be needed. The submission of the Plan marks, however, a stage in the journey and prepares the way for the harnessing of the nation's efforts and resources for the fulfillment of the Plan.

This makes the planning process a flexible and pragmatic one and lends support to the contention that there is nothing dogmatic or doctrinaire in the Indian planning. It has to be adjusted according to the changing circumstances, and, as a matter of fact, it has been adjusted during the past decade. Flexibility brings a new life and zeal to the whole process. Periodic reviews of various phases of planning are conducted by economists, and sometimes committees of parliament undertake investigations of planning programs. In the light of such detailed checkups, often corrective measures are undertaken. The catholicity with which flexibility has been built into Indian planning may thus seem strikingly remarkable.

Synthetic Preparation of Apiose From Dihydroxy Acetone

by

Charles Pratt*

Abstract

A five-carbon sugar of unusual interest is apiose. This sugar differs from the normal pentoses in that it possesses a branched chain. The sugar has been isolated from parsley and its structure determined (1). In 1962 it was isolated by paper chromatography in the Savannah State College laboratories (2).

This paper deals with the synthesis of apiose by consecutive cyanide additions beginning with dihydroxy acetone.

Experimental

Twenty-two and one half grams [.25 mol.] of dihydroxy acetone were added to 0.25 mol of sodium bisulfite dissolved in 100 ml of water, and the mixture was refluxed for about 30 minutes until all materials were in solution. The solution was then evaporated to dryness under reduced pressure.

To the dried product, one-fourth mole of sodium cyanide and 400 ml of water were added, and the mixture was refluxed for eight hours.

After refluxing, the cyano-compound formed was oxidized by refluxing for 3 hours with 150 ml of concentrated hydrochloric acid. The reactions assumed to take place are shown in figure 1.

The 2-hydroxymethyl-2, 3-dihydroxy propionic acid was dialyzed and the resulting ion-free solution was concentrated under reduced pressure to approximately 200 ml. To this solution were added lumps of sodium amalgam. The solution was constantly stirred with a magnetic stirrer. As the Na-Hg decomposed the solution tended to become basic [pH was measured constantly by zeromatic pH meter] and therefore, hydrochloric acid was added from time to time to maintain a pH of 2.5-3.0.

The mercury which was formed by the decomposition of Na-Hg was removed, and the remaining solution was neutralized and dialyzed to remove excess salts. Following dialysis, the 4-carbon alde-

*The investigator is indebted to Ellen Polite and Andrew Zeigler, chemistry students, at Savannah State College, for their cooperation and assistance.

hyde was subjected to the same cyanide addition steps as was the dihydroxy acetone. Apiose was the final result. This is shown in figure 2.

Fehlings Solution gave a positive result when used to test a small portion of the final product. Another portion was spotted with Whatman No. 1 chromatography paper and its R_f value was compared with that of authentic apiose which had been isolated from parsley [2].

Summary

The branched 5-carbon sugar, apiose, was prepared by cyanide addition to 1,3-dihydroxy acetone; hydrolysis to the acid of the resulting cyano compound; reduction of the acid to a 4-carbon aldehyde, and the cyanide addition repeated. The results were interpreted by paper chromatography, and by standard methods of sugar identification.

Acknowledgments

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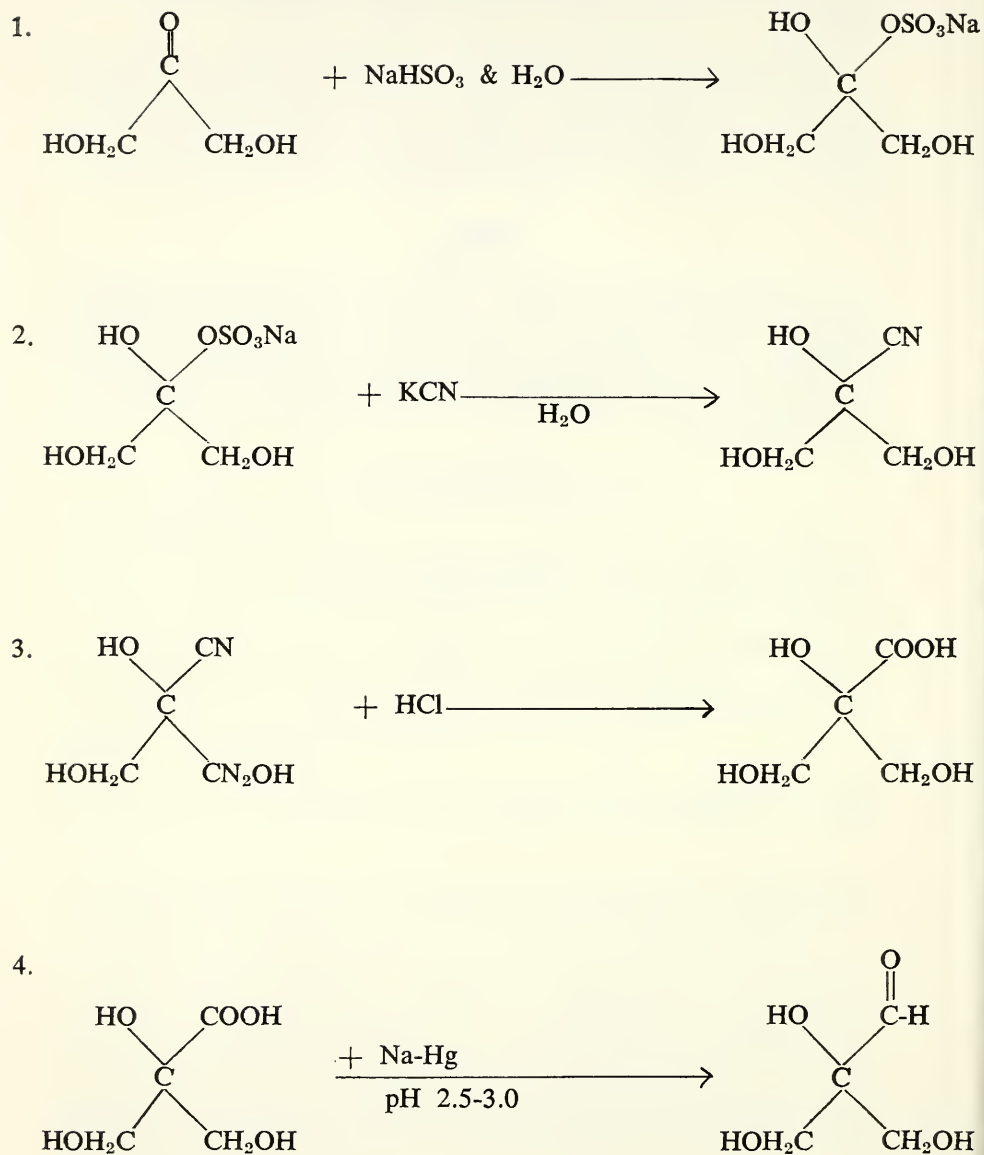


Figure 1.

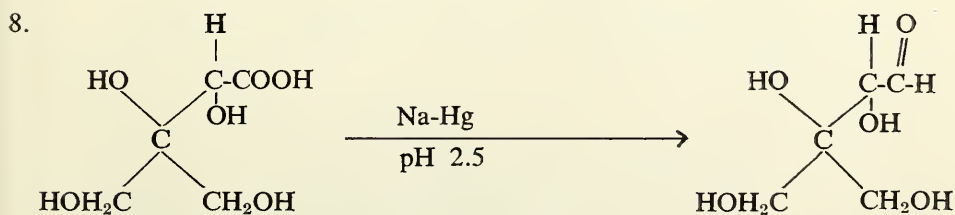
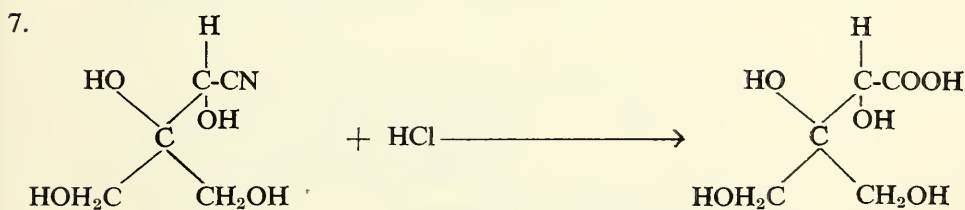
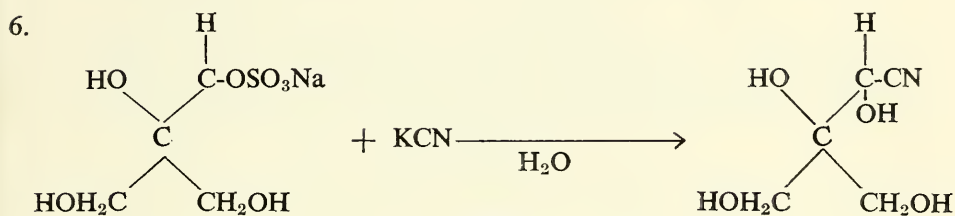
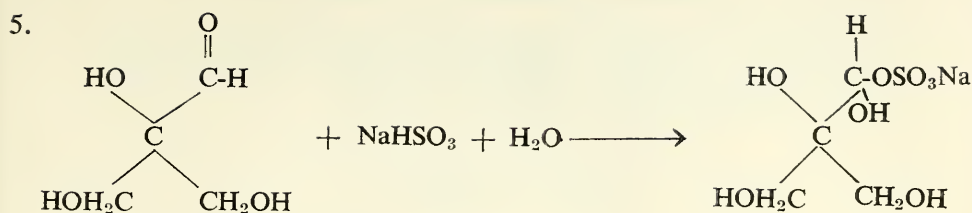


Figure 2.

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Deflection of Streams Behind a Curved Shock Wave

by

Nazir A. Warsi

1. INTRODUCTION.

If the angle between the tangent to the stream line and the unit normal vector (X^i) to the shock surface be Θ , then

$$(1.1) \quad V_{\alpha n/} = V_{\alpha i/} X^i = V_{\alpha/} \cos \Theta_{\alpha/}$$

where $V_{\alpha i/}$ is the velocity vector in the region $\alpha/$. If the space components of a vector field tangential to the surface are $t_{\alpha i/}$, then

$$(1.2) \quad V_{\alpha i/} t_{\alpha i/} = V_{\alpha/} \sin \Theta_{\alpha/}$$

The law of conservation of mass at the shock surface is given by [1]

$$(1.3) \quad [\dot{V}^i] = \delta \varepsilon_{\alpha/} V_{\alpha n/} X^i$$

Multiplying it by $t_{\alpha i/}$ and summing with respect to i we get

$$(1.4)a \quad [\dot{V}^i] t_{\alpha i/} = 0$$

or

$$(1.4)b \quad V_{2/} \sin \Theta_{2/} = V_{1/} \sin \Theta_{1/} = 2$$

2. DEFLECTION OF STREAMS.

We have the following theorems.

THEOREM 2.1: *The angle that the stream line makes with the unit normal X^i is given by*

$$(2.1) \quad \cot \Theta_{2/} = (\delta \varepsilon_{\alpha/} + 1) \cot \Theta_{1/}$$

PROOF: Multiplying (1.3) by X^i and summing with respect to i , we get

$$(2.2)a \quad [\dot{V}_{n/}] = \delta \varepsilon_{\alpha/} V_{\alpha n/}$$

or

$$(2.2)b \quad V_{2/} \cos \Theta_{2/} = (\delta \varepsilon_{\alpha/} + 1) V_{1/} \cos \Theta_{1/}$$

Equations (1.4)b and (2.2)b give (2.1).

THEOREM 2.2: *For both the regions, the ratio $\cot \Theta / \varepsilon$ is constant, that is*

$$(2.3) \quad \frac{\cot \Theta_{\alpha/}}{\varepsilon_{\alpha/}} = \frac{1}{\mu}$$

PROOF: By virtue of the relation $\delta z_1 = \frac{[z]}{z_1}$, equation (2.1) gives (2.3).

THEOREM 2.3: For an unsteady flow behind the shock wave, we have

$$(2.4) \quad \omega = -\mu h' n_1$$

PROOF: Dividing (2.2)b by (1.4)b, we get

$$(2.5)a \quad \cot \theta_{21} = \frac{(\delta z_1 + 1)}{z_1} V_{11} \cos \theta_{11}$$

or

$$(2.5)b \quad \cot \frac{\theta_{21}}{z_1} = \frac{1}{\omega z_1} V_{11} n_1$$

which, in consequence of (2.3) and the relation $\delta z_1 = [z]/z_1$, gives (2.4)

THEOREM 2.4: The specific volume strength of the shock is defined as the ratio of difference of cotangent of the angle of emergence and the cotangent of the angle of incidence to the cotangent of angle of incidence.

PROOF: From (2.1), it is obvious that

$$(2.6) \quad \delta z_1 = [\cot \theta] / \cot \theta_{11}$$

3. MAXIMUM DEFLECTION.

Mishra (1960) studied the deflection and found that $\theta_{21} > \theta_{11}$. Angle of deflection of the stream behind the shock is given by $[\theta]$. Therefore, the angle of the deflection, Ω is given by

$$(3.1) \quad \cot \Omega = \cot [\theta] = \frac{\cot \theta_{21} \cot \theta_{11} + 1}{\cot \theta_{11} - \cot \theta_{21}}$$

Substituting for $\cot \theta_{21}$ from (2.1), the equation (3.1) gives

$$(3.2)a \quad \cot \Omega = \frac{(\delta z_1 + 1) \cot^2 \theta_{11} + 1}{-\delta z_1 \cot \theta_{11}}$$

or

$$(3.2)b \quad \cot \Omega = \frac{2}{\delta z_1} \frac{(1 + \delta z_1 \cos^2 \theta_{11})}{\sin 2\theta_{11}}$$

or

$$(3.2)c \quad \cot \Omega = \frac{\delta z_1 + 1 + \xi^2}{-\delta z_1 \xi}$$

where $\xi = \tan \theta_{11}$

Hence, we have the following theorems.

THEOREM 3.1: In the case of maximum deflection for a fixed δz_1 , we have

$$(3.3) \quad \xi = \tan^2 \theta_{11} = 1 + \delta z_1$$

PROOF: For the maximum deflection, we have

$$(3.4) \quad \frac{\partial \Omega}{\partial \xi} = 0$$

Differentiating (3.2)c with respect to ξ and using (3.4), we get (3.3)

THEOREM 3.2. *In the case of the maximum deflection for a fixed $\mathcal{S}_{z/}$, the ratio of specific volume of two regions is the same as the ratio of square of the tangent of the angle of incidence to unity.*

PROOF: For the maximum deflection, we have

$$(3.5)a \tan^2 \theta_{1/} = 1 + \mathcal{S}_{z/}$$

or

$$(3.5)b \tan^2 \theta_{1/} : 1 = z_{2/} : z_{1/}$$

THEOREM 3.3. *Maximum deflection for a fixed $\mathcal{S}_{z/}$ is given by*

$$(3.6) \cot \underline{\alpha} = \pm \frac{2}{\mathcal{S}_{z/}} \sqrt{\mathcal{S}_{z/} + 1}$$

PROOF: In consequence of (3.3), the equation (3.2)c gives (3.6).

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